W918. DRUMMER-1. VOL. 2.

DEPT. NAT. RES & ENV
PE905435

WCR (VOL.2)
DRUMMER-1
(W918)

ESSO EXPLORATION AND PRODUCTION
AUSTRALIA INC.

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WELL COMPLETION REPORT

DRUMMER-1
INTERPRETED DATA
VOLUME 2

12 JUN 1987

GIPPSLAND BASIN
VICTORIA

ESSO AUSTRALIA LIMITED

Compiled by: W.MUDGE

NOV.1986

DRUMMER-1

WELL COMPLETION REPORT

VOLUME 2

(Interpretative Data)

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GEOLOGICAL AND GEOPHYSICAL ANALYSIS

PROGNOSIS (KB = 21M)

Formation/Horizon	Pre-drill Depth (mSS)	Post-drill Depth (mSS)
SEASPRAY GROUP	74	74
LATROBE GROUP	2422	2411
a) Seismic Marker Top of Fm-1.4/M-1.02 Equivalents	2440	2430*
Top of Basal Sands of Fm-1.4/M-1.0.2	2465	2430*

* Represents base of P. asperopolus/Lower N. asperus channel

INTRODUCTION

Drummer-1 was drilled to test the oil potential of a stratigraphic trap resulting from the truncation of shoreface sands of the 52.5MA sequence. The sands were inferred to subcrop the Lakes Entrance Formation midway between Rockling-1 and Tailor-1.

Drummer-1 was drilled to a total depth of 2571mKB without encountering hydrocarbons. The predicted shoreface sands were absent at the Drummer-1 location due to erosion by a younger P. asperopolus/Lower N. asperus channel. This channel is filled with a tight offshore and lower shoreface facies.

In addition the lateral equivalents of the FM-1.4/M-1.0.2 which were predicted to provide a base seal had undergone a facies change to fluvial channel sands.

STRUCTURE AND STRATIGRAPHY

Drummer-1 was drilled on the southwestern upthrown side of a major SW-SE trending fault which separates it from the Fortescue/Cobia fields to the north. The intra-Latrobe sediments dip westward more steeply than the Top of Latrobe Group unconformity. A stratigraphic trap is set up with the top seal and lateral seal being provided by the Lakes Entrance Formation.

The pre-drill predicted stratigraphy is shown in Enclosure 1. The interval of interest is the package above the 52.5MA Unconformity. The predicted section consists of basal fluvial channel sands overlain by coastal plain shales and coals (FM-1.4/M-1.0.2 equivalents) which create a pressure discontunity in Rockling-1. These are in turn overlain by shoreface and lower shoreface sands which were the targeted reservoir sands in Drummer-1. These sands are then truncated by a middle-upper N. asperus channel which is filled with a tight offshore and lower shoreface sequence which in turn is truncated by the Top of Latrobe unconformity.

The post-drill stratigraphy is shown in Enclosure 2. The interval above the 52.5MA unconformity consists of thicker than predicted basal fluvial sands. This interval represents the pre-drill basal sand and coastal plain package (FM-1.4/M-1.0.2 equivalent). A facies change has occurred between Rockling-1 and Drummer-1 such that none of the Rockling coastal plain section is penetrated at Drummer-1.

However the major cause of the failure of Drummer-1 is the error in intra-Latrobe dip prediction between Rockling-1 and Drummer-1. Most markers came in approximately 10m high to prediction which has ensured that Drummer-1 missed the Rockling "seal" unit. The trap still may exist between Rockling-1 and Drummer-1, but must now be considered to be very small.

Overlying the fluvial sands is a relatively thick section of P. asperopolus/Lower N. asperus and middle N. asperus offshore and lower shoreface facies. This interval represents the amalgamation of two channels which have cut down and eroded the targeted shoreface sands at the Drummer-1 well location.

The P. asperopolus/Lower N. asperus channel fill in Drummer-1 is younger than the fill in Taylor-1. The Taylor-1 channel fill represents that of the sandy channel axis while the Drummer-1 fill was deposited later as sea level rose drowning the channel.

The 52.5MA sands penetrated at Drummer are equivalents of the M-1.1.1. of the Cobia and Halibut fields. These are dry due to breaching updip by the P. asperopolus/Lower N. asperus channel in Tailor-1, a possibility recognised pre-drill.

CONCLUSIONS

1. The proposed reservoir sands are not present at the Drummer-1 location due to an error in intra-latrobe dip prediction. The reservoirs may still exist west of Drummer but would be very small.

2. The predicted base seal section (FM-1.4/M-1.0.2) had undergone a facies change to fluvial channel sands resulting in the base (Rockling) seal not being intersected.

3. The sands of the 52.5MA sequence M-1.1.1 penetrated at the Drummer-1 location were dry due to breaching updip by the P. asperopolus/Lower N. asperus channel at the Tailor-1 location.

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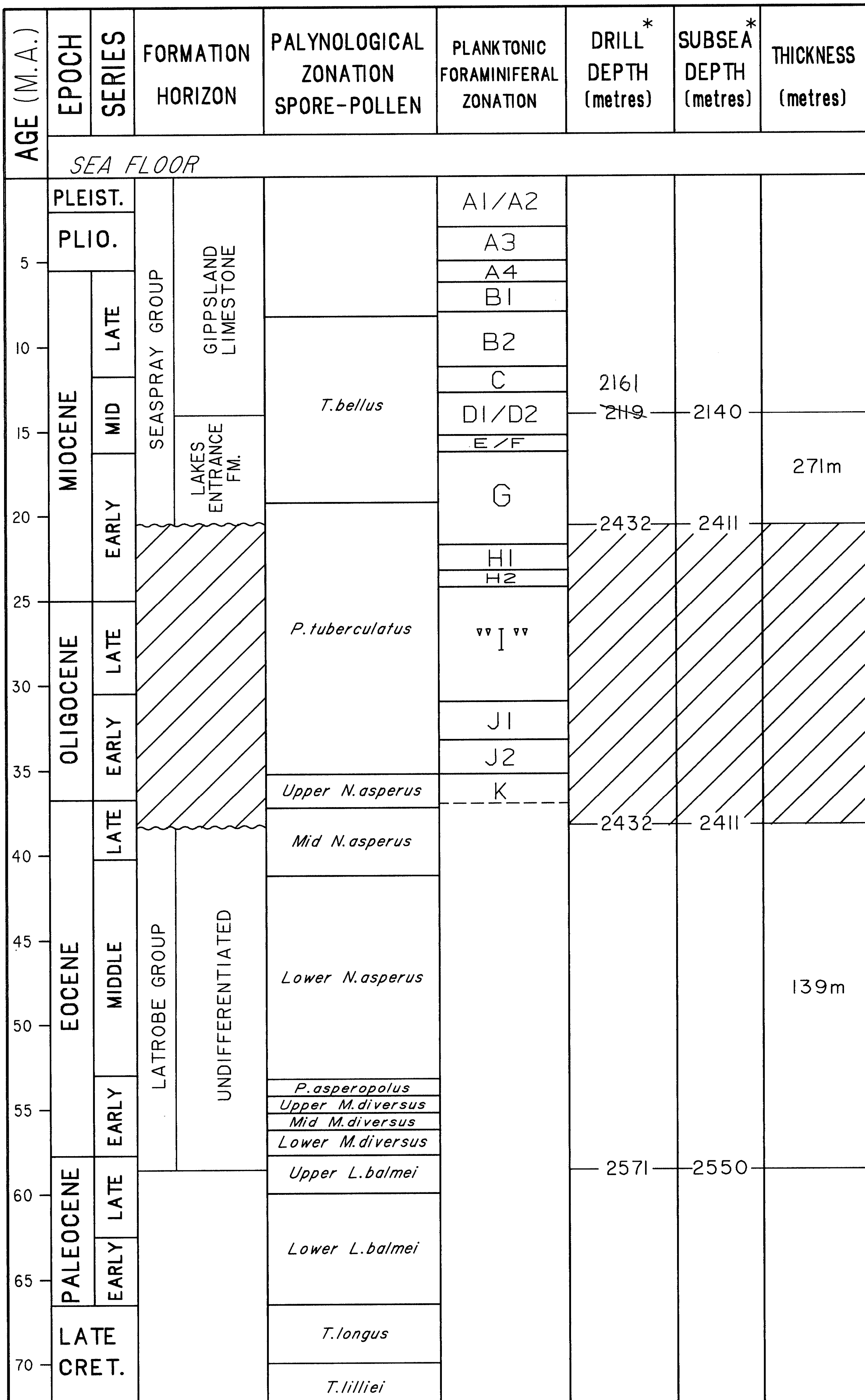
FIGURES

FIGURES

DRUMMER-1
STRATIGRAPHIC TABLE



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APPENDIX 1

APPENDIX

PALYNOLOGICAL ANALYSIS OF DRUMMER-1, GIPPSLAND BASIN

by

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Esso Australia Ltd.
Palaeontology Report 1986/3

January, 1986

2094L/1

INTERPRETATIVE DATA

INTRODUCTION

Twenty seven sidewall cores were processed and examined for spore-pollen and dinoflagellates. Yields and preservation were adequate to make confident age-determinations for most samples.

Lithological units and palynological zones from the base of the Lakes Entrance Formation to T.D. are summarized below; anomalous and unusual occurrences of taxa are listed in Table 2. Basic data are given in Table 3.

SUMMARY

AGE	UNIT	SPORE-POLLEN ZONE	DINO ZONE	DEPTH (m)
Oligocene/ Miocene	Lakes Entrance Fm.	P. tuberculatus	-	2431.5m
		log break at 2432.0m		
Oligocene?	"Fortescue Shale"	P. tuberculatus	-	2433.0m
		log break at 2434.5m		
Late Eocene	Gurnard Fm. equivalent	Middle N. asperus	C. incompositum	2435.0m
		Middle N. asperus	-	2436.5-2438.5m
Middle Eocene		Lower N. asperus	A diktyoplokus	2441.5-2443.5m
Middle Eocene		Lower N. asperus	T. pandus	2446.7m
		log break at 2447.0m		
Early-Middle Eocene	"Opah Channel Fill"	Lower N. asperus/ P. asperopolus	T. pandus/ T. asteris	2448.2-2450.2m
		log break at 2451.5m		
Early Eocene	Latrobe Group coarse clastics	Lower M. diversus	-	2485.5m
		Lower M. diversus	A. hyperacantha?	2487.8m
		Upper L. balmei	A. homomorpha	2493.5-2541.0m

T.D. 2571m

GEOLOGICAL COMMENTS

1. Drummer-1 contains a thick sequence of Paleocene-Early Eocene, Upper L. balmei to Lower M. diversus Zone, sediments that are unconformably overlain by a thin condensed sequence of Early to Late Eocene, P. asperopolus to Middle N. asperus Zone, siltstones.

2. The condensed interval, picked on gamma log response as occurring between 2434.0m and 2451.5m, is capped by a glauconitic claystone containing good P. tuberculatus Zone palynofloras but lacking forams. On the basis of the driller's depth, the lowermost P. tuberculatus Zone sample (SWC 27, 2433.0m) was taken in the thin shale corresponding to the log spike between 2432.0 and 2434.0m. This shale is provisionally equated with the P. tuberculatus Zone unit which has been informally referred to as "Fortescue Shale" (Oligocene Wedge), present above approx. 2492.5m in Rockling-1 and in other wells in the southwestern portion of the Fortescue-Cobia-Halibut Field. Carbonates in the overlying Lakes Entrance Formation at 2429.0m and 2431.5m, are recrystallized and these samples contain only trace amounts of glauconite (M.J. Hannah, pers. comm.).

3. Three biostratigraphically and lithologically distinct units can be recognized within the condensed sequence below the "Fortescue Shale" (carbonate values based on geochemical analyses, D. Hill, pers. comm.):-

   (a) a Middle N. asperus Zone, highly calcareous (40-63%) siltstone unit, between 2435.0 and 2440.0m. Glauconite occurs in the uppermost sample at 2435.0m, which also contains dinoflagellates diagnostic of the C. incompositum Zone. The unit may be part of a poorly (log) defined coarsening upwards sequence and is likely to represent a lower shoreface environment.

   (b) a Lower N. asperus Zone, moderately calcareous (25-30%) siltstone unit, between 2440.0 and 2447.0m. This unit comprises sediments deposited during A. diktyoplokus and T. pandus Zone times (see Partridge 1976, 1985). T. pandus Zone sediments are stratigraphically separated from the (younger) A. diktyoplokus Zone sediments by an unzoned interval in Marlin-A1 but it is not yet clear how these zones relate to regional changes in sea level within the basin during the Middle Eocene.

   (c) a slightly calcareous (6-7%) siltstone unit, between 2447.0 and 2451.5m. This unit contains indicator species of both the P. asperopolus/T. asteris and Lower N. asperus/T. pandus Zones (see Biostratigraphy Section). Whether the unit represents a T. asteris

Zone sediment that is in situ but burrowed (as is likely in any condensed sequence), or whether the sediment as a whole has been reworked during T. pandus Zone times, is unclear.

The condensed sequence as a whole displays the typical 'Gurnard Formation' log response of high density, high neutron porosity. Glauconite is absent except at 2443.5 and 2446.7m (M.J. Hannah, pers. comm.). The log character is probably due to ferruginized shale pellets (2435.0, 2436.5, 2439.0m) and ferric cements (2443.5, 2446.7m). High neutron porosity values indicate a high clay content. It is not clear how much of the carbonate occurs as a calcitic or dolomitic cement.

4. The Middle and Lower N. asperus Zone units are provisionally equated with the Gurnard Formation, widely developed across the basin during this time. Alternatively, and supported by the abundance of carbonate, the Middle N. asperus Zone unit between 2435.0 and 2440.0m resembles the "Bullseye Marl" unit of glauconitic marls and claystones deposited in the area west of Kingfish during the Late Eocene-Early Oligocene.

5. Sediments of Middle N. asperus Zone age are absent in both Rockling-1 and Tailor-1; a Lower N. asperus/A. diktyoplokus Zone unit occurs immediately below the "Fortescue Shale" in Rockling-1 whilst the youngest Latrobe Group sediments in Tailor-1 are Lower N. asperus/T. pandus Zone in age. This situation, in which the most complete sequence of Middle-Late Eocene sediments is preserved in the middle of a sequence of three wells aligned (Rockling-1 to Tailor-1) along the direction of depositional downdip is unusual. It may be as much a consequence of the very low depositional rates and subtle changes on relief on the paleoseafloor as of differential erosion.

6. The P. asperopolus/T. asteris unit in Drummer-1 is correlated with the "Opah Formation" in Opah-1 and Tailor-1 (Limbert et al. 1983, Partridge 1985). The channel fill in Drummer-1 (3.3m) is thinner than that present in Tailor-1 (4.5m).

7. The occurrence of Lower M. diversus Zone sediments in Rockling-1 and Drummer-1, but not (structurally updip) in Tailor-1, confirms the geological prognosis that the thick M. diversus Zone sand unit between 2452.5 and 2476.5m in Drummer-1 subcrops against the base of the P. asperopolus channel between Drummer-1 and Tailor-1.

8. Shales underlying this sand unit contain Lower M. diversus Zone palynofloras containing dinoflagellates, but not species diagnostic of the A. hyperacanthum Zone marine transgression. Nevertheless the presence of

Apectodinium hyperacanthum believed to be caved into Upper L. balmei Zone sediments at 2499.0m indicates that A. hyperacanthum Zone sediments may be present in Drummer-1. A possible source is the shale between (gamma log depths) 2485.5 and 2492.5m. This unit occurs between the 52.5 Myr and 54 Myr unconformities picked at approx. 2484 and 2499m respectively (V. Labutis pers. comm.). Note that frequent Apectodinium hyperacanthum occurs at 2562.5m in Rockling-1, above the 52.5 Myr unconformity, picked at approx. 2568m.

9. Except for the sample at 2531.5m, which corresponds to the log depth of the highest coal encountered in Drummer-1, samples within the Upper L. balmei Zone contain low numbers of A. homomorpha Zone dinoflagellates. This indicates a lagoonal/estuarine, rather than an open marine, environment existed at the wellsite during the Paleocene. The well is likely to have reached total depth still within in Upper L. balmei Zone sediments.

BIOSTRATIGRAPHY

Zone boundaries have been established using criteria proposed by Stover & Partridge (1973) and subsequent proprietary revisions.

Upper Lygistepollenites balmei Zone: 2493.5-2541.0m

Samples within this interval contain Proteacidites - gymnosperm dominated palynofloras in which the nominate species is usually frequent. Many samples contain species restricted to the L. balmei Zone, e.g. Polycolpites langstonii, or which range no higher than the Upper L. balmei Zone, e.g. Gambierina rudata and Australopollis obscurus. Occurrences of Banksieaeidites lunatus, Malvacipollis diversus, M. subtilis, Proteacidites annularis and Integricorpus antipodus at 2541.0m provide a confident Upper L. balmei Zone age for this, the lowest sidewall core sample taken. Cyathidites gigantis occurs at 2539.0, 2534.2, and 2504.5m. The dinoflagellate Apectodinium homomorpha is present throughout but is mostly rare. The upper boundary is picked at 2493.5m, the highest sample containing Banksieaeidites lunatus and Proteacidites annularis with Lygistepollenites balmei, Australopollis obscurus and Gambierina rudata.

Lower Malvacipollis diversus Zone: 2478.8-2487.8m

Four samples are assigned to this zone. The lowermost, at 2487.8m, contains Spinizonocolpites prominatus. Although Apectodinium homomorpha only was recorded, the sample may represent the A. hyperacantha transgression. A single specimen of Apectodinium hyperacantha was found caved into Upper L. balmei/A. homomorpha Zone sediments at 2499.0m. Spinizonocolpites prominatus occurs with Proteacidites kopiensis at 2485.5m. The uppermost sample, at 2478.8m, lacks species diagnostic of a Lower M. diversus Zone age. The sample is provisionally assigned to this zone on the basis of relatively frequent occurrences of Tetracolporites multistrixus, Malvacipollis subtilis and Proteacidites grandis. Nevertheless the sample also contains Conbaculites apiculatus and Anacolosidites acutullus, species which only very rarely extends below the P. asperopolus and Middle M. diversus Zones respectively. The Paleocene-Early Eocene dinoflagellate Palaeoperidinium bassensis dominates the palynoflora.

Lower Nothofagidites asperus (Tritonites pandus)/
Proteacidites asperopolus (Tritonites asteris) Zone: 2448.2-2450.2m

Samples within this interval contain typical P. asperopolus Zone spore-pollen assemblages including Conbaculites apiculatus, and at 2448.2m, species which range no higher than the P. asperopolus Zone, e.g. Myrtaceidites tenuis, Homotryblium tasmaniense and the very rare acritarch Tritonites asteris ms. However Tritonites pandus, a rare species not known to range below the Lower N. asperus/T. pandus Zone, occurs at both 2448.2 and 2450.2m. Two explanations exist: (i) T. pandus first appears within the P. asperopolus Zone, suggesting the possibility that a hitherto unrecognized zone defined by the simultaneous occurrence of T. asteris and T. pandus occurs between the P. asperopolus/T. asteris Zone and the Lower N. asperus/T. pandus Zone (cf. Partridge 1985) or (ii) the interval represents a body of P. asperopolus/T. asteris Zone sediments burrowed into or reworked during T. pandus Zone times. The sample at 2448.2m contains reworked Lygistepollenites balmei

Lower Nothofagidites asperus/Tritonites pandus Zone: 2446.7m

One sample is provisionally assigned to this zone. Tritonites pandus is present but because of the small size and extreme rarity of T. asteris, it is not possible to be certain that this latter species is not also present.

Lower Nothofagidites asperus/Areosphaeridium diktyoplokus Zone: 2441.5-2443.5m

The two samples within this interval contain frequent Nothofagidites, including N. falcatus at 2443.5m, and rare specimens of Areosphaeridium diktyoplokus. The Early Eocene dinoflagellate Homotryblium tasmaniense occurs at 2443.5m, suggesting some reworking. The same dinoflagellate is also recorded in a Lower N. asperus zone assemblage at 2495.5m in Rockling-1.

Middle Nothofagidites asperus Zone: 2435.0-2438.5m

Except at 2435.0m samples within this interval lack species restricted to the Middle N. asperus Zone spore-pollen. The base of the zone is provisionally picked at 2438.5m because of the similarity of spore-pollen species in this sample (frequent Nothofagidites, Myrtaceidites verrucosus) with palynofloras at 2436.5 and 2435.0m. A stripped specimen of either Proteacidites asperopolus or P. pachypolus is present. Nothofagidites falcatus shows the sample at 2438.5m is no older than Lower N. asperus Zone. Proteacidites rectomarginis, a species which first appears in the Middle N. asperus Zone occurs at 2436.5m. The sample at 2435.0m contains the Middle N. asperus Zone indicator dinoflagellate, Corrudinium incompositum.

Proteacidites tuberculatus Zone: 2431.5-2433.0m

Samples within this interval are dominated by dinoflagellates. The zone indicator species Cyatheacidites annulatus is present throughout.

TABLE I: SUMMARY OF INTERPRETATIVE PALYNOLOGICAL DATA

DRUMMER-1

SAMPLE NO.	DEPTH (m)	SPORE-POLLEN ZONE	DINOFLAGELLATE ZONE	AGE	CONFIDENCE RATING	COMMENTS
SWC 30	2427.5	Indeterminate	-	-	-	barren
SWC 28	2431.5	P. tuberculatus	-	Oligocene/Miocene	0	C. annulatus
SWC 27	2433.0	P. tuberculatus	-	Oligocene/?	0	C. annulatus
SWC 26	2435.0	Middle N. asperus	C. incompositum	Late Eocene	1	C. incompositum
SWC 25	2436.5	Middle N. asperus	-	Late Eocene	1	P. rectomarginis, M. verrucosus
SWC 24	2438.5	Middle N. asperus	-	Late Eocene	2	C. corrugatum, M. verrucosus
SWC 22	2441.5	Lower N. asperus	A. diktyoplokus	Middle Eocene	1	A. diktyoplokus
SWC 21	2443.5	Lower N. asperus	A. diktyoplokus	Middle Eocene	0	N. falcatus, A. diktyoplokus
SWC 19	2446.7	Lower N. asperus	T. pandus	Middle Eocene	1	T. pandus
SWC 18	2448.2	Lower N. asperus/P. asperopolus		Early/Middle Eocene	-	T. asteris, T. pandus, M. tenuis, C. apiculatus, H. tasmaniense
SWC 17	2450.2	Lower N. asperus/P. asperopolus		Early/Middle Eocene	-	T. pandus, C, apiculatus
SWC 16	2478.8	Lower M. diversus	-	Early Eocene	2	T. multistrixus freq., C. apiculatus A. acutullus
SWC 15	2481.2	Indeterminate	-	-	-	barren
SWC 14	2485.5	Lower M. diversus	-	Early Eocene	1	S. prominatus, P. kopiensis
SWC 13	2487.8	Lower M. diversus	?A. hyperacantha	Early Eocene	1	S. prominatus, A. homomorpha
SWC 12	2493.5	Upper L. balmei	A. homomorpha	Paleocene	1	L. balmei, G. rudata, A. obscurus, P. annularis, B. lunatus, A. homomorpha

TABLE I: SUMMARY OF INTERPRETATIVE PALYNOLOGICAL DATA

DRUMMER-1

SAMPLE NO.	DEPTH (m)	SPORE-POLLEN ZONE	DINOFLAGELLATE ZONE	AGE	CONFIDENCE RATING	COMMENTS
SWC 11	2496.0	Upper L. balmei	A. homomorpha	Paleocene	1	L. balmei freq., P. annularis, A. homomorpha
SWC 10	2499.0	Upper L. balmei	A. homomorpha	Paleocene	2	L. balmei, M. diversus, A. homomorpha
SWC 9	2500.2	Upper L. balmei	A. homomorpha	Paleocene	1	L. balmei, M. diversus, M. subtilis
SWC 8	2502.5	Upper L. balmei	A. homomorpha	Paleocene	1	P. langstonii, A. homomorpha
SWC 7	2504.5	Upper L. balmei	-	Paleocene	0	L. balmei freq., C. gigantis, P. grandis, P. langstonii, M. diversus
SWC 6	2509.0	Upper L. balmei	A. homomorpha	Paleocene	1	L. balmei freq., M. diversus, A. homomorpha
SWC 5	2511.5	Upper L. balmei	A. homomorpha	Paleocene	1	L. balmei common, B. lunatus, A. homomorpha
SWC 4	2531.5	Upper L. balmei	-	Paleocene	1	B. lunatus, P. langstonii
SWC 3	2534.2	Upper L. balmei	A. homomorpha	Paleocene	0	C. gigantis, P. langstonii, A. homomorpha
SWC 2	2539.0	Upper L. balmei	A. homomorpha	Paleocene	0	C. gigantis, P. langstonii, A. homomorpha
SWC 1	2541.0	Upper L. balmei	-	Paleocene	0	I. notabilis, B. lunatus, M. diversus

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TABLE 2

ANOMALOUS AND UNUSUAL OCCURRENCES OF SPORE-POLLEN TAXA IN DRUMMER-1

SAMPLE NO.	DEPTH(m)	ZONE	TAXON	COMMENTS
SWC 25	2436.5	Middle N. asperus (1)	Myrtaceidites verrucosus	Rare sp. assoc. with P. rectomarginis
SWC 24	2438.5	Middle N. asperus (2)	Myrtaceidites verrucosus	Rare sp.
SWC 24	2438.5	Middle N. asperus (2)	Proteacidites unicus	Rare ms. sp.
SWC 22	2441.5	Lower N. asperus (1)	Myrtaceidites eucalyptoides	Rare sp. (A. diktyoplokus Zone)
SWC 22	2441.5	Lower N. asperus (1)	Haloragacidites verrucato harrisii	Rare sp. (A. diktyoplokus Zone)
SWC 22	2441.5	Lower N. asperus (1)	Phyllocladidites palaeogenicus	Rare sp. (A. diktyoplokus Zone)
SWC 22	2441.5	Lower N. asperus (1)	Matonisporites ornamentalis	Uncommon in this zone
SWC 21	2443.5	Lower N. asperus (1)	Cunoniaceae 3-p	Modern taxon (A. diktyoplokus Zone)
SWC 21	2443.5	Lower N. asperus (1)	Parvisaccites catastus	Uncommon sp.
SWC 21	2443.5	Lower N. asperus (1)	Podocarpidites ostentatus	Uncommon ms. sp.
SWC 19	2446.7	Lower N. asperus/T. pandus	Cunoniaceae 2-p	Modern taxon
SWC 19	2446.7	Lower N. asperus/T. pandus	Tritonites pandus	Rare ms. acritarch sp.
SWC 18	2448.2	Lower N. asperus/ P. asperopolus	Tritonites pandus & T. asteris	Rare ms. acritarch spp. assoc. with M. tenuis
SWC 18	2448.2	Lower N. asperus/ P. asperopolus	Cunoniaceae 3 & 2-p	Modern taxa
SWC 18	2448.2	Lower N. asperus/ P. asperopolus	Gothanipollis bassensis	Rare sp.
SWC 18	2448.2	Lower N. asperus/ P. asperopolus	Proteacidites reticulatus	Uncommon sp.
SWC 18	2448.2	Lower N. asperus/ P. asperopolus	Dryptopollenites semilunatus	Rare sp.

<u>TABLE 2</u>

ANOMALOUS AND UNUSUAL OCCURRENCES OF SPORE-POLLEN TAXA IN DRUMMER-1

SAMPLE NO.	DEPTH(m)	ZONE	TAXON	COMMENTS
SWC 18	2448.2	Lower N. asperus/ P. asperopolus	Beaupreadites trigonalis	Rare sp.
SWC 17	2450.2	Lower N. asperus/ P. asperopolus	Tritonites pandus	Not previously recorded below T. asteris, assoc. with C. apiculatus
SWC 16	2478.8	Lower M. diversus	Conbaculites apiculatus	V. rare below P. asperopolus Zone
SWC 16	2478.8	Lower M. diversus	Anacolosidites acutullus	V. rare below Middle M. diversus Zone
SWC 16	2478.8	Lower M. diversus	Banksieaeidites lunatus	Uncommon in this zone
SWC 14	2485.5	Lower M. diversus (1)	Dryptopollenites semilunatus	Rare sp.
SWC 14	2485.5	Lower M. diversus (1)	Parvisaccites catastus	Rare sp.
SWC 13	2487.8	Lower M. diversus (1)	Tricolporites angurium	Rare in Early Eocene
SWC 11	2496.0	Upper L. balmei (1)	Amosopollis cruciformis	Uncommon sp.
SWC 10	2499.0	Upper L. balmei (2)	Phyllocladidites paleogenicus	Uncommon sp.
SWC 10	2499.0	Upper L. balmei (2)	Banksieaeidites elongatus	Caved?
SWC 10	2499.0	Upper L. balmei (2)	Apectodinium hyperacantha	Caved
SWC 8	2502.5	Upper L. balmei (1)	Foveogleicheniidites sp.	Apiculate var. of rare ms. genus
SWC 8	2502.5	Upper L. balmei (1)	Tricolpites waiparaensis	V. rare above Upper T. longus Zone
SWC 6	2509.0	Upper L. balmei (1)	Triporopollenites ambiguus	Rare Paleocene occurrence
SWC 5	2511.5	Upper L. balmei (1)	Triporopollenites ambiguus	Rare Paleocene occurrence. Also at 2539.0 & 2541.0m
SWC 5	2511.5	Upper L. balmei (1)	Anacolosidites acutullus	V. rare Paleocene occurrence
SWC 5	2511.5	Upper L. balmei (1)	Rouseisporites reticulatus	Appears in situ (Late K sp.)

TABLE 2

ANOMALOUS AND UNUSUAL OCCURRENCES OF SPORE-POLLEN TAXA IN DRUMMER-1

SAMPLE NO.	DEPTH(m)	ZONE	TAXON	COMMENTS
SWC 4	2531.5	Upper *L. balmei* (1)	*Beaupreadites verrucosus*	Appears *in situ* (Eocene sp.)
SWC 4	2531.5	Upper *L. balmei* (1)	*Tetracolporites textus*	Rare sp.
SWC 3	2534.2	Upper *L. balmei* (0)	*Tetracolporites textus*	Rare sp. assoc. with *C. gigantis*
SWC 2	2539.0	Upper *L. balmei* (0)	*Tetracolporites textus*	Rare sp. assoc. with *C. gigantis*
SWC 2	2539.0	Upper *L. balmei* (0)	*Jaxtacolpus peiratus*	Rare sp.
SWC 1	2541.0	Upper *L. balmei* (0)	*Integricorpus antipodus*	Rare sp.
SWC 1	2541.0	Upper *L. balmei* (0)	*Banksieaeidites elongatus*	?not previously recorded in this zone
SWC 1	2541.0	Upper *L. balmei* (0)	*Proteacidites wahooensis*	Late Cretaceous sp.

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TABLE 3: SUMMARY OF BASIC PALYNOLOGICAL DATA

DRUMMER-1

DIVERSITY -	low	medium	high
S & P	less than 10	10-30	greater than 30
D	1-3	3-10	10

SAMPLE NO.	DEPTH (m)	YIELD SPORE-POLLEN	YIELD DINOS	DIVERSITY SPORE-POLLEN	DIVERSITY DINOS	PRESERVATION	LITHOLOGY	PYRITIZATION	COMMENTS
SWC 30	2427.5	-	-	-	-	-	Clyst., calc., glau.	-	Barren 57% carbonate
SWC 28	2431.5	Low	Low	Low	Low	Poor	Clyst., calc., glau.	-	36.4%
SWC 27	2433.0	V. low	Low	Low	Medium	Poor	Clyst., calc., glau.	-	32% carbonate
SWC 26	2435.0	Low	Low	Medium	Medium	Good	Slst., calc., glau.	-	40.5% carbonate
SWC 25	2436.5	Low	Low	Medium	Low	Fair	Slst., calc., sandy	-	
SWC 24	2438.5	Low	Low	Medium	Low	Fair	Slst., calc., sandy	-	62.9% carbonate
SWC 22	2441.5	Low	Low	Medium	Medium	Fair	Slst., calc., coaly	-	24.5% carbonate
SWC 21	2443.5	Low	Low	Medium	Medium	Poor	Slst., glau., calc.	-	30.7% carbonate
SWC 19	2446.7	V. low	Low	Low	Medium	Poor	Ss., coaly	-	32.8% carbonate
SWC 18	2448.2	Low	Low	High	High	Good	Sh., carb., coaly	-	6.4% carbonate
SWC 17	2450.2	Low	V. low	Medium	Low	Poor	Sh., carb., coaly	-	
SWC 16	2478.8	Fair	Fair	High	Low	Fair	Sh., carb.	Minor	
SWC 15	2481.2	-	-	-	-	-	Slst.	-	Barren
SWC 14	2485.5	V. low	-	Medium	-	Good	Slst.	Minor	
SWC 13	2487.8	Low	V. low	Medium	Low	Poor	Slst.	Moderate	
SWC 12	2493.5	Low	Low	High	Low	Fair	Ss., carb.	Moderate	Contaminated
SWC 11	2496.0	Low	Good	Medium	Low	Fair	Sh., carb.	-	
SWC 10	2499.0	Good	Fair	Medium	Low	Poor	Sh., carb.	Strong	Contaminated

TABLE 3: SUMMARY OF BASIC PALYNOLOGICAL DATA

DRUMMER-1

DIVERSITY -	low	medium	high
S & P	less than 10	10-30	greater than 30
D	1-3	3-10	10

SAMPLE NO.	DEPTH (m)	YIELD		DIVERSITY		PRESERVATION	LITHOLOGY	PYRITIZATION	COMMENTS
		SPORE-POLLEN	DINOS	SPORE-POLLEN	DINOS				
SWC 9	2500.1	Low	V. low	Medium	Low	Poor	Slst., carb.	Moderate	
SWC 8	2502.5	Fair	Low	Medium	Medium	Fair	Ss.	Moderate	
SWC 7	2504.5	Fair	-	Medium	-	Poor	Sh., carb.	-	
SWC 6	2509.0	V. good	V. low	Medium	Low	Poor	Ss., carb.	Strong	
SWC 5	2511.5	Fair	-	Medium	-	Fair	Sh., carb.	Minor	
SWC 4	2531.5	Fair	-	Medium	-	Poor	Slst.	-	
SWC 3	2534.2	Low	Low	Medium	Medium	Fair	Sh., carb.	Minor	
SWC 2	2539.0	Good	V. low	Medium	Low	Poor	Sh., pyr.	Moderate	
SWC 1	2541.0	Good	Low	Medium	Low	Poor	Slst.	-	

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PALYNOLOGY DATA SHEET

BASIN: Gippsland　　　ELEVATION: KB: +21.0m　GL: -74.0m

WELL NAME: Drummer-1　　　TOTAL DEPTH: 2571m

AGE	PALYNOLOGICAL ZONES	HIGHEST DATA Preferred Depth	Rtg	Alternate Depth	Rtg	Two Way Time	LOWEST DATA Preferred Depth	Rtg	Alternate Depth	Rtg	Two Way Time
NEOGENE	*T. pleistocenicus*										
	M. lipsis										
	C. bifurcatus										
	T. bellus										
	P. tuberculatus	2431.5	0				2433.0	0			
PALEOGENE	Upper *N. asperus*										
	Mid *N. asperus*	2435.0	0				2438.5	2	2436.5	1	
	Lower *N. asperus*	2441.5	1				2446.7	1			
	Lower *N. asperus*/ *P. asperopolus*	2448.2	-				2450.2	-			
	Upper *M. diversus*										
	Mid *M. diversus*										
	Lower *M. diversus*	2478.8	2	2485.5	1		2487.8	1			
	Upper *L. balmei*	2493.5	1				2541.0	0			
	Lower *L. balmei*										
LATE CRETACEOUS	Upper *R. longus*										
	Lower *R. longus*										
	T. lilliei										
	N. senectus										
	T. apoxyexinus										
	P. mawsonii										
	A. distocarinatus										
EARLY CRET.	*P. pannosus*										
	C. paradoxa										
	C. striatus										
	C. hughesi										
	F. wonthaggiensis										
	C. australiensis										

COMMENTS: The following dinoflagellate zones are recognized:
C. incompositum 2435.0m; A. diktyoplokus 2441.5-2443.5m;
T. pandus 2446.7m; T. pandus/T. asteris 2448.2-2450.2m;
A. hyperacantha? 2487.8m; A. homomorpha 2493.5-2541.0m

CONFIDENCE RATING:
- O: SWC or Core, Excellent Confidence, assemblage with zone species of spores, pollen and microplankton.
- 1: SWC or Core, Good Confidence, assemblage with zone species of spores and pollen or microplankton.
- 2: SWC or Core, Poor Confidence, assemblage with non-diagnostic spores, pollen and/or microplankton.
- 3: Cuttings, Fair Confidence, assemblage with zone species of either spores and pollen or microplankton, or both.
- 4: Cuttings, No Confidence, assemblage with non-diagnostic spores, pollen and/or microplankton.

NOTE: If an entry is given a 3 or 4 confidence rating, an alternative depth with a better confidence rating should be entered, if possible. If a sample cannot be assigned to one particular zone, then no entry should be made, unless a range of zones is given where the highest possible limit will appear in one zone and the lowest possible limit in another.

DATA RECORDED BY: M.K. Macphail　　　DATE: 21/1/86

DATA REVISED BY: ______　　　DATE: ______

APPENDIX 2

APPENDIX 2

PE902371

This is an enclosure indicator page.
The enclosure PE902371 is enclosed within the container PE905435 at this location in this document.

The enclosure PE902371 has the following characteristics:

ITEM_BARCODE = PE902371
CONTAINER_BARCODE = PE905435
NAME = Palynological range chart
BASIN = GIPPSLAND
PERMIT =
TYPE = WELL
SUBTYPE = DIAGRAM
DESCRIPTION = Palynological range chart
REMARKS =
DATE_CREATED =
DATE_RECEIVED = 12/06/1987
W_NO = W918
WELL_NAME = Drummer-1
CONTRACTOR = ESSO
CLIENT_OP_CO = ESSO

(Inserted by DNRE - Vic Govt Mines Dept)

FORAMINIFERAL ANALYSIS, DRUMMER-1
GIPPSLAND BASIN

by

M.J. HANNAH

ESSO AUSTRALIA LTD.
PALAEONTOLOGY REPORT 1986/12

March 1986

2225L

INTRODUCTION

The foraminiferal content of nine sidewall cores has been examined. Only the highest sample (SWC 17 at 2450.24 m) yielded any planktonic foraminifera. These were Zone G (Early to Middle Miocene) in age.

TOP OF LATROBE

The top of the Latrobe group lies between sidewall cores 26 at 2435.06 and 28 at 2431.55. The boundary is marked by a change upsection from a fine glauconitic quartz sand to a highly recrystalized carbonate.

BIOSTRATIGRAPHY

ZONE G - Early to Middle Miocene; SWC 29 at 2429.0 m.

A poorly preseved foraminiferal assemblage was recovered from sidewall core 29 at 2429.0m. The assemblage included Globorotalia miozea, Globigerina falconensis, Globigernia woodi connecta and Globigerinoides trilobus. The recognition of this latter species without Globigerinoides sicanus is the reason for the Zone G assignment.

DEPTH (m)	SWC NO.	YIELD	PRESERVATION	ZONE	AGE	LITHOLOGY*
2435.06	26	Barren	-	-	-	Fine quartz sand; glauconitic, pyritic
2431.55	28	Barren	-	-	-	Completely recrystalized carbonate.
2429.00	29	Low	Poor	G	Early-Middle Miocene	Dominantly recrystalized foram tests

TABLE-1 DRUMMER-1 DATA SUMMARY

* Lithology from washed residues

2225[redacted]

PLANKTONIC MICROFOSSIL

DEPTH (m)	SWC NO.	YIELD	PRESERVATION	ZONE	AGE	LITHOLOGY*
2450.24	17	Barren	-	-	-	Medium-fine quartz sand; pyritic, glauconitic.
2446.78	19	Barren	-	-	-	Medium-fine quartz sand glauconitic.
2445.04	20	Barren	-	-	-	Medium fine clean quartz sand.
2439.56	23	Barren	-	-	-	Fine quartz sand shaley glauconitic
2443.50	21	Barren	-	-	-	Fine quartz sand; shaley, glauconitic.
2436.54	25	Barren	-	-	-	Fine ferruginous quartz sand. Common agglutinated foraminifera

APPENDIX 3

APPENDIX 3

DRUMMER-1

QUANTITATIVE LOG ANALYSIS

Interval: 2432.75-2552.0m MDKB

Analyst : J.B. Kulla

Date : December, 1985

DRUMMER-1 QUANTITATIVE LOG ANALYSIS

Summary

Drummer-1 wireline logs have been analysed for effective water saturation (Swe) and effective porosity (PHIE) over the inverval 2432.75m to 2552m MDKB. The summary of results is in Table 1. The top of porosity starts at 2450.50m. Four water sands are encountered with fair to very good porosity. No hydrocarbon zones are found.

The LDT-CNL are good over the interval of interest. A 1-1/2" standoff was used on the DLT. The resistivity logs also appear good.

Log Analysis

The following well log curves were used in the log analysis:

1. Laterolog Deep (LLD)
2. Laterolog Shallow (LLS)
3. Gamma Ray
4. Caliper
5. Density curve (RHOB) from the Lithology Density Log (LDL) and
6. Neutron porosity (NPHI) from the Compensated Neutron Log (CNL)
7. Micro spherically focused log (MSFL)

PHIE and Swe are calculated using reiterative techniques for (a) hydrocarbon corrections to the porosity logs, (b) shale volume determinations using density-neutron crossplot porosities, and (c) convergence on a preselected grain density window by shale volume adjustment. The Dual Water model is used to correct for clay-bound water effects in the calculation of water saturation.

Analysis Parameters

a	1.00
m	2.00
n	2.00
*RHOB (Shale)	2.60 gm/cc
*NPHI (Shale)	0.30
Rmf at 78.3^{o} C	0.11 ohm.m
Grain Density (window)	2.65-2.67 gm/cc
*RSH	10.00 ohm.m
RHOH	0.70 gm/cc
Salinity (ppm NaCl equiv.)	55,000

* Read from well logs.

Shale Volume

An initial estimate of VSH is calculated from the density neutron separation:

$$VSH = \frac{NPHI - \frac{2.65 - RHOB}{1.65}}{NPHISH - \frac{2.65 - RHOBSH}{1.65}} \qquad - 1$$

Total Porosity

Total porosity was initially calculated from the density-neutron log using the following algorithms:

$$h = 2.71 - RHOB + NPHI\,(RHOF - 2.71) \qquad - 2$$

if h is greater than 0, then

$$\text{apparent matrix density, } RHOMa = 2.71 - h/2 \qquad - 3$$

if h is less than 0, then

$$\text{apparent matrix density, } RHOMa = 2.71 - 0.64h \qquad - 4$$

$$\text{Total porosity: } PHIT = \frac{RHOMa - RHOB}{RHOMa - RHOF} \qquad - 5$$

where RHOB = environ. corrected bulk density in gms/cc
NPHI = environ. corrected neutron porosity in limestone porosity units.
RHOF = fluid density (1.0 gms.cc)

Free Water Salinity

Apparent free water salinities are calculated using the following relationships:

$$Rw = \frac{Rt * PHIT^m}{a} \qquad - 6$$

$$\text{Salinity (ppm)} = \left(\frac{300{,}000}{Rw\,(Ti + 7) - 1}\right)^{1.05} \qquad - 7$$

where Ti = formation temperature in ^{o}F.

Bound Water Resistivities (Rwb) and Saturation of Bound Water (Swb)

Rwb and Swb were calculated using the following relationships:

$$Rwb = \frac{RSH * PHISH^m}{a} \qquad - 8$$

where PHISH = total porosity in shale from density-neutron crossplots.
RSH = Rt in shales.

$$Swb = \frac{VSH * PHISH}{PHIT} \qquad - 9$$

Water Saturations

Water saturations were determined from the Dual Water model using the following relationships:

$$\frac{1}{Rt} = SwT^n * \frac{PHIT^m}{aRw} + SwT^{(n-1)}\left[\frac{Swb * PHIT^m}{a}\left(\frac{1}{Rwb} - \frac{1}{Rw}\right)\right] \qquad -10$$

and

$$\frac{1}{Rxo} = SxoT^n * \frac{PHIT^m}{aRw} + SxoT^{(n-1)}\left[\frac{Swb * PHIT^m}{a}\left(\frac{1}{Rwb} - \frac{1}{Rmf}\right)\right] \qquad -11$$

where SwT = total saturation in the virgin formation
SxoT = total saturation in the invaded zone
Rmf = resistivity of mud filtrate
n = saturation exponent

Hydrocarbon Corrections

Hydrocarbon corrections to the environmentally corrected density and neutron logs were made using the following relationships:

$$RHOBHC = RHOB + 1.07\ PHIT\ (1-SxoT)\ [(1.11-0.15P)\ RHOF - 1.15\ RHOH] \quad -12$$

$$NPHIHC = NPHI + 1.3\ PHIT\ (1-SxoT)\ \frac{RHOF\ (1-P) - 1.5\ RHOH + 0.2}{RHOF\ (1-P)} \quad -13$$

where RHOBHC = hydrocarbon corrected RHOB
NPHIHC = hydrocarbon corrected PHIN
RHOH = hydrocarbon density (0.25 gms/cc for gas, 0.7 gms/cc for oil)
P = mud filtrate salinity in parts per unity

Grain Density

Grain density (RHOG) was calculated from the hydrocarbon corrected density and neutron logs using the following relationships:

$$RHOBC = \frac{RHOBHC - VSH * RHOBSH}{1 - VSH} \quad -14$$

$$NPHIC = \frac{PHINHC - VSH * NPHISH}{1 - VSH} \quad -15$$

and equations 2, 3 and 4 are then used to compute RHOG.

The calculated grain density was then compared to the upper and lower limits of the grain densities and if it fell within the limits, effective porosity (PHIE) and effective saturation (Swe) were calculated as follows:

$$PHIE = PHIT - VSH * PHISH \quad -16$$

$$Swe = 1 - \frac{PHIT}{PHIE}\ (1-SwT) \quad -17$$

If the calculated grain density fell outside the limits, VSH was adjusted in appropriate increments and PHIT, SwT, SxoT and RHOG recalculated.

All zones with VSH greater than 60%, carbonaceous shales and coals, Swe was set to 1 and PHIE set to 0.

DRUMMER-1

TABLE 1

SUMMARY OF RESULTS

Interval (m)	Gross Thickness (m)	* Net Thickness (m)	Average Porosity ± STD (%)	Average Water Saturation
2450.50 - 2486.00	35.50	34.50	.20 ± .02	1.04
2491.50 - 2498.25	6.75	4.00	.16 ± .02	1.01
2504.00 - 2529.75	25.75	23.25	.21 ± .04	1.03
2542.00 - 2549.75	7.75	7.00	.22 ± .01	1.02

* Net porosity cutoff of 10%.

27381/82

LIST

DEPTH	.GR	.RT	.RXO	.RHOB	.NPHIC	.VSHO	.SXOE	.PHIE	.SWEC
2450.000	119.584	4.604	7.220	2.506	.277	.703	1.000	.000	1.000
2450.250	122.818	5.582	6.812	2.506	.279	.710	1.000	.000	1.000
2450.500	116.022	5.184	8.201	2.482	.290	.696	1.000	.000	1.000
2450.750	106.859	3.280	6.680	2.490	.262	.612	1.000	.000	1.000
2451.000	82.080	2.204	4.342	2.478	.237	.523	1.000	.035	1.098
2451.250	57.860	1.799	2.884	2.413	.229	.377	1.000	.132	1.097
2451.500	44.740	1.677	1.908	2.378	.217	.251	1.000	.159	1.054
2451.750	39.238	1.680	2.022	2.349	.199	.120	.994	.184	.984
2452.000	44.418	1.704	2.188	2.334	.192	.060	.976	.198	.941
2452.250	49.137	1.548	1.853	2.329	.201	.082	.988	.199	.970
2452.500	44.889	1.464	1.778	2.328	.205	.097	.999	.198	.996
2452.750	33.436	1.388	1.718	2.348	.187	.074	1.000	.188	1.093
2453.000	27.451	1.458	1.788	2.342	.191	.078	1.000	.192	1.045
2453.250	30.735	1.651	1.794	2.336	.199	.091	.983	.194	.957
2453.500	37.922	1.584	2.412	2.345	.207	.140	1.000	.185	1.000
2453.750	36.693	1.331	2.375	2.328	.207	.104	1.000	.198	1.045
2454.000	28.676	1.194	1.514	2.301	.200	.030	1.000	.219	1.037
2454.250	24.762	1.239	1.521	2.307	.188	.000	1.000	.218	1.040
2454.500	23.740	1.325	1.653	2.326	.178	.000	1.000	.206	1.061
2454.750	22.058	1.334	1.807	2.327	.177	.000	1.000	.205	1.061
2455.000	21.235	1.256	1.690	2.316	.179	.000	1.000	.211	1.066
2455.250	20.090	1.277	1.578	2.331	.176	.000	1.000	.204	1.092
2455.500	20.022	1.376	1.673	2.354	.172	.030	1.000	.189	1.100
2455.750	21.308	1.407	1.916	2.349	.170	.000	1.000	.195	1.087
2456.000	22.751	1.352	1.799	2.328	.190	.030	1.000	.205	1.040
2456.250	21.936	1.319	1.567	2.324	.193	.030	1.000	.208	1.040
2456.500	24.430	1.355	1.713	2.321	.181	.000	1.000	.209	1.033
2456.750	28.873	1.409	1.730	2.313	.177	.000	1.000	.211	1.007
2457.000	34.120	1.426	1.792	2.316	.164	.000	1.000	.204	1.031
2457.250	28.069	1.348	1.771	2.308	.157	.000	1.000	.204	1.062
2457.500	22.829	1.311	1.524	2.310	.173	.000	1.000	.210	1.045
2457.750	27.111	1.371	1.518	2.330	.177	.000	1.000	.205	1.051
2458.000	31.333	1.509	2.054	2.319	.195	.000	.979	.216	.948
2458.250	37.469	1.551	2.074	2.321	.209	.096	.978	.203	.946
2458.500	37.014	1.400	2.194	2.327	.193	.000	1.000	.212	1.001
2458.750	31.418	1.284	1.672	2.301	.189	.000	1.000	.220	1.010
2459.000	28.918	1.278	1.537	2.310	.179	.000	1.000	.213	1.046
2459.250	26.471	1.430	1.907	2.350	.158	.000	1.000	.190	1.099
2459.500	31.029	1.558	2.204	2.362	.158	.000	1.000	.185	1.088
2459.750	36.934	1.537	2.289	2.366	.180	.088	1.000	.177	1.095
2460.000	36.645	1.534	2.160	2.364	.195	.141	1.000	.174	1.083
2460.250	34.186	1.524	2.056	2.358	.192	.114	1.000	.179	1.068
2460.500	36.608	1.567	1.958	2.346	.195	.099	1.000	.188	1.013
2460.750	39.985	1.688	2.097	2.358	.184	.087	1.000	.181	1.017
2461.000	44.035	1.792	2.345	2.386	.169	.092	1.000	.164	1.084
2461.250	44.051	1.657	3.480	2.374	.190	.144	1.000	.167	1.075
2461.500	37.766	1.437	1.853	2.337	.199	.097	1.000	.193	1.033
2461.750	29.881	1.270	1.896	2.314	.193	.000	1.000	.217	1.029
2462.000	26.173	1.239	1.508	2.324	.197	.000	1.000	.215	1.054
2462.250	28.547	1.278	1.703	2.333	.188	.000	1.000	.208	1.070
2462.500	27.604	1.309	1.807	2.338	.171	.000	1.000	.199	1.093
2462.750	23.660	1.362	1.893	2.360	.146	.000	1.000	.181	1.091
2463.000	20.832	1.399	2.023	2.362	.132	.000	1.000	.174	1.099
2463.250	19.557	1.425	2.003	2.363	.136	.000	1.000	.175	1.090
2463.500	21.890	1.519	2.067	2.375	.131	.000	1.000	.169	1.096
2463.750	23.779	1.658	2.285	2.379	.118	.000	1.000	.162	1.092

LIST

DEPTH	.GR	.RT	.RXO	.RHOB	.NPHIC	.VSHO	.SXOE	.PHIE	.SWEC
2464.000	26.286	1.613	2.830	2.385	.118	.000	1.000	.160	1.096
2464.250	28.838	1.307	2.281	2.354	.153	.000	1.000	.186	1.091
2464.500	28.521	1.119	1.556	2.330	.165	.000	1.000	.200	1.099
2464.750	23.410	1.125	1.830	2.332	.152	.000	1.000	.194	1.094
2465.000	20.152	1.144	1.811	2.328	.162	.000	1.000	.199	1.091
2465.250	22.041	1.249	1.670	2.352	.144	.000	1.000	.183	1.098
2465.500	22.734	1.420	2.256	2.384	.108	.000	1.000	.156	1.091
2465.750	20.868	1.449	2.338	2.368	.109	.000	1.000	.162	1.096
2466.000	20.486	1.307	2.071	2.346	.118	.000	1.000	.174	1.093
2466.250	21.524	1.256	1.959	2.339	.123	.000	1.000	.179	1.094
2466.500	19.976	1.312	2.022	2.351	.124	.000	1.000	.175	1.095
2466.750	22.959	1.354	2.346	2.361	.115	.000	1.000	.167	1.090
2467.000	24.910	1.317	2.055	2.341	.137	.000	1.000	.184	1.091
2467.250	24.866	1.214	1.914	2.328	.146	.000	1.000	.192	1.096
2467.500	24.680	1.177	1.773	2.319	.148	.000	1.000	.197	1.096
2467.750	22.341	1.151	1.872	2.306	.153	.000	1.000	.203	1.092
2468.000	22.223	1.128	1.702	2.310	.153	.000	1.000	.202	1.091
2468.250	20.533	1.171	1.724	2.332	.149	.000	1.000	.192	1.099
2468.500	19.878	1.168	2.084	2.336	.166	.000	1.000	.198	1.094
2468.750	20.062	1.170	1.771	2.332	.175	.000	1.000	.203	1.094
2469.000	22.950	1.159	1.953	2.347	.156	.000	1.000	.190	1.099
2469.250	23.375	1.193	1.793	2.353	.148	.000	1.000	.184	1.097
2469.500	21.730	1.183	1.922	2.349	.144	.000	1.000	.184	1.093
2469.750	23.004	1.170	1.769	2.322	.151	.000	1.000	.197	1.098
2470.000	23.281	1.157	1.681	2.321	.165	.000	1.000	.203	1.090
2470.250	25.200	1.170	1.889	2.332	.156	.000	1.000	.195	1.099
2470.500	21.985	1.187	1.683	2.332	.155	.000	1.000	.195	1.094
2470.750	20.143	1.218	1.694	2.327	.159	.000	1.000	.198	1.098
2471.000	22.906	1.161	1.866	2.310	.161	.000	1.000	.205	1.095
2471.250	23.793	1.130	1.582	2.297	.167	.000	1.000	.213	1.091
2471.500	25.825	1.145	1.593	2.307	.160	.000	1.000	.206	1.098
2471.750	25.654	1.117	1.714	2.312	.153	.000	1.000	.201	1.100
2472.000	25.789	1.036	1.541	2.296	.174	.000	1.000	.216	1.093
2472.250	27.981	.997	1.470	2.283	.200	.000	1.000	.231	1.089
2472.500	28.426	1.027	1.457	2.277	.195	.000	1.000	.231	1.072
2472.750	25.838	1.090	1.445	2.288	.187	.000	1.000	.224	1.074
2473.000	27.474	1.190	1.589	2.311	.169	.000	1.000	.208	1.095
2473.250	30.552	1.170	1.801	2.308	.171	.000	1.000	.210	1.095
2473.500	28.533	1.129	1.406	2.291	.191	.000	1.000	.225	1.051
2473.750	23.988	1.070	1.354	2.293	.171	.000	1.000	.216	1.094
2474.000	25.321	1.088	1.586	2.287	.169	.000	1.000	.217	1.098
2474.250	30.444	1.155	1.659	2.313	.180	.000	1.000	.212	1.091
2474.500	28.998	1.331	1.757	2.362	.164	.000	1.000	.188	1.098
2474.750	27.262	1.414	2.374	2.354	.136	.000	1.000	.179	1.092
2475.000	33.776	1.396	2.095	2.330	.142	.000	1.000	.190	1.098
2475.250	34.891	1.201	1.930	2.316	.187	.000	1.000	.214	1.072
2475.500	30.639	1.082	1.555	2.280	.210	.000	1.000	.236	1.021
2475.750	29.021	1.010	1.410	2.263	.198	.000	1.000	.238	1.051
2476.000	29.966	1.112	1.548	2.281	.167	.000	1.000	.218	1.090
2476.250	37.486	1.214	1.725	2.306	.162	.000	1.000	.207	1.098
2476.500	43.313	1.161	1.969	2.291	.197	.000	1.000	.227	1.026
2476.750	43.032	1.140	1.454	2.274	.203	.000	.999	.236	.997
2477.000	54.431	1.245	1.626	2.290	.206	.000	.990	.231	.975
2477.250	63.184	1.368	1.912	2.302	.217	.083	.982	.215	.956
2477.500	47.932	1.293	1.860	2.310	.201	.000	.999	.222	.996
2477.750	34.248	1.136	1.717	2.307	.187	.000	1.000	.217	1.084

LIST

DEPTH	.GR	.RT	.RXO	.RHOB	.NPHIC	.VSHO	.SXOE	.PHIE	.SWEC
2478.000	41.207	1.205	1.632	2.322	.159	.000	1.000	.200	1.092
2478.250	72.623	1.320	2.146	2.328	.176	.000	1.000	.205	1.066
2478.500	100.014	1.424	2.020	2.320	.193	.000	.992	.215	.979
2478.750	111.998	1.355	2.138	2.323	.190	.000	1.000	.212	1.014
2479.000	100.491	1.284	1.752	2.305	.225	.118	.996	.211	.990
2479.250	67.023	1.253	1.669	2.292	.218	.065	.989	.223	.973
2479.500	56.260	1.277	1.687	2.311	.200	.000	1.000	.221	1.005
2479.750	61.434	1.308	1.902	2.329	.176	.000	1.000	.205	1.072
2480.000	87.110	1.417	1.959	2.336	.165	.000	1.000	.197	1.067
2480.250	114.391	1.554	2.092	2.345	.186	.066	1.000	.191	1.017
2480.500	121.836	1.495	2.084	2.336	.221	.175	.998	.187	.995
2480.750	119.777	1.481	1.814	2.316	.239	.196	.973	.198	.944
2481.000	121.993	1.507	2.003	2.327	.223	.160	.986	.194	.965
2481.250	130.691	1.518	2.136	2.332	.222	.167	.990	.190	.974
2481.500	119.523	1.524	2.084	2.333	.221	.169	.990	.190	.976
2481.750	117.241	1.564	2.468	2.333	.204	.106	.989	.194	.972
2482.000	126.450	1.505	1.860	2.310	.227	.135	.967	.206	.950
2482.250	111.185	1.467	1.813	2.315	.239	.193	.974	.199	.946
2482.500	100.174	1.647	2.239	2.348	.215	.178	.991	.180	.977
2482.750	103.601	1.741	2.300	2.357	.198	.138	.994	.178	.985
2483.000	101.704	1.463	1.908	2.323	.212	.110	.990	.200	.975
2483.250	84.966	1.274	1.613	2.292	.228	.102	.984	.219	.962
2483.500	77.615	1.309	1.634	2.300	.211	.000	.983	.229	.957
2483.750	76.724	1.423	2.032	2.317	.216	.112	.988	.204	.971
2484.000	71.391	1.461	2.039	2.323	.225	.158	.987	.197	.968
2484.250	66.973	1.367	1.949	2.324	.221	.147	1.000	.197	1.009
2484.500	70.820	1.266	1.801	2.301	.227	.116	.994	.213	.986
2484.750	83.880	1.208	1.609	2.290	.235	.121	.992	.219	.981
2485.000	101.718	1.170	1.688	2.300	.228	.119	1.000	.213	1.025
2485.250	128.392	1.181	1.649	2.295	.236	.136	1.000	.215	1.003
2485.500	145.939	1.255	1.781	2.336	.245	.262	1.000	.183	1.071
2485.750	149.125	2.092	3.309	2.466	.207	.386	1.000	.105	1.092
2486.000	144.899	3.783	8.772	2.540	.182	.458	1.000	.042	1.090
2486.250	138.806	5.646	7.677	2.541	.180	.454	1.000	.043	1.029
2486.500	136.673	5.621	7.875	2.555	.192	.531	1.000	.016	1.056
2486.750	135.496	6.004	8.387	2.579	.205	.602	1.000	.000	1.000
2487.000	140.407	6.152	9.173	2.593	.202	.620	1.000	.000	1.000
2487.250	150.721	4.446	5.988	2.540	.202	.531	1.000	.019	1.070
2487.500	168.664	2.490	3.492	2.495	.207	.449	1.000	.065	1.095
2487.750	195.946	1.996	2.423	2.456	.217	.400	1.000	.110	1.098
2488.000	183.531	2.232	2.396	2.482	.220	.469	1.000	.060	1.092
2488.250	149.650	2.963	5.026	2.567	.207	.610	1.000	.000	1.000
2488.500	134.477	3.583	3.149	2.601	.218	.700	1.000	.000	1.000
2488.750	129.276	3.645	4.957	2.626	.219	.760	1.000	.000	1.000
2489.000	134.828	3.008	2.856	2.622	.220	.753	1.000	.000	1.000
2489.250	134.362	2.654	3.851	2.568	.235	.687	1.000	.000	1.000
2489.500	130.531	2.948	3.827	2.533	.220	.583	1.000	.000	1.046
2489.750	130.409	3.521	4.840	2.564	.198	.573	1.000	.000	1.098
2490.000	123.010	4.979	7.877	2.588	.196	.618	1.000	.000	1.000
2490.250	119.942	5.516	7.006	2.576	.197	.594	1.000	.000	1.017
2490.500	117.201	5.914	7.631	2.585	.211	.635	1.000	.000	1.000
2490.750	117.558	6.607	9.665	2.589	.199	.602	1.000	.000	1.000
2491.000	117.267	7.122	10.880	2.597	.206	.646	1.000	.000	1.000
2491.250	111.314	6.487	5.583	2.631	.225	.789	1.000	.000	1.000
2491.500	102.517	4.639	5.940	2.603	.216	.697	1.000	.000	1.000
2491.750	81.622	3.970	.939	2.516	.179	.391	1.000	.076	1.090

LIST

DEPTH	.GR	.RT	.RXO	.RHOB	.NPHIC	.VSHO	.SXOE	.PHIE	.SWEC
2492.000	66.169	4.004	3.603	2.491	.147	.217	1.000	.098	1.045
2492.250	68.799	4.497	5.889	2.516	.147	.274	1.000	.081	1.095
2492.500	61.142	3.794	9.325	2.512	.144	.255	1.000	.084	1.091
2492.750	39.891	2.165	5.253	2.430	.149	.118	1.000	.136	1.097
2493.000	27.401	1.583	2.078	2.359	.139	.000	1.000	.178	1.096
2493.250	23.829	1.501	2.192	2.322	.140	.000	1.000	.192	1.064
2493.500	27.889	1.576	1.996	2.356	.161	.000	1.000	.188	1.058
2493.750	31.837	1.807	2.271	2.384	.158	.000	1.000	.177	1.050
2494.000	42.781	2.286	2.641	2.393	.140	.000	.997	.167	.992
2494.250	57.173	2.878	4.027	2.423	.128	.000	.990	.151	.974
2494.500	49.069	2.464	5.670	2.391	.134	.000	.987	.165	.968
2494.750	30.758	1.526	2.428	2.362	.147	.000	1.000	.181	1.092
2495.000	25.879	1.264	1.661	2.371	.176	.086	1.000	.174	1.099
2495.250	42.217	1.237	1.414	2.339	.214	.152	1.000	.188	1.092
2495.500	66.287	2.335	3.335	2.403	.217	.309	.972	.141	.940
2495.750	83.617	4.147	7.212	2.475	.265	.617	1.000	.000	1.000
2496.000	104.594	6.214	8.007	2.504	.269	.668	1.000	.000	1.000
2496.250	101.867	6.419	7.782	2.504	.270	.674	1.000	.000	1.000
2496.500	84.060	4.355	7.914	2.471	.259	.586	.991	.000	.979
2496.750	51.254	2.286	2.595	2.354	.220	.211	.924	.175	.948
2497.000	40.961	2.219	.854	2.334	.209	.124	.916	.193	.943
2497.250	67.252	3.162	2.054	2.397	.240	.380	.883	.141	.944
2497.500	69.478	3.708	6.572	2.434	.227	.386	.888	.123	.945
2497.750	52.934	3.352	4.310	2.458	.179	.261	.978	.116	.946
2498.000	61.606	3.384	3.838	2.496	.214	.477	1.000	.051	1.038
2498.250	87.096	4.368	10.369	2.542	.265	.741	1.000	.000	1.000
2498.500	104.171	6.019	10.397	2.587	.260	.823	1.000	.000	1.000
2498.750	112.555	5.681	4.806	2.623	.289	1.000	1.000	.000	1.000
2499.000	116.839	5.367	9.243	2.586	.346	1.000	1.000	.000	1.000
2499.250	115.739	4.828	3.744	2.507	.332	.910	1.000	.000	1.000
2499.500	102.499	4.835	4.256	2.451	.272	.590	.991	.000	.978
2499.750	99.748	4.792	8.550	2.469	.210	.402	.885	.101	.947
2500.000	109.339	4.568	7.105	2.490	.199	.000	1.000	.000	1.000
2500.250	111.163	4.861	5.125	2.486	.209	.000	1.000	.000	1.000
2500.500	103.393	5.472	6.964	2.403	.248	.000	1.000	.000	1.000
2500.750	98.129	5.732	6.787	2.336	.236	.000	1.000	.000	1.000
2501.000	81.218	4.779	7.227	2.402	.178	.000	1.000	.000	1.000
2501.250	63.974	3.987	5.008	2.436	.175	.000	1.000	.000	1.000
2501.500	58.424	3.666	3.633	2.408	.181	.000	1.000	.000	1.000
2501.750	62.788	3.050	3.938	2.404	.180	.174	.936	.147	.946
2502.000	76.223	3.375	4.503	2.452	.181	.257	.966	.119	.947
2502.250	96.351	4.792	8.678	2.537	.208	.546	1.000	.015	1.024
2502.500	101.883	8.121	9.554	2.537	.232	.608	1.000	.000	1.000
2502.750	104.649	8.182	11.054	2.531	.225	.598	.998	.000	.995
2503.000	102.269	6.492	10.895	2.526	.207	.521	.961	.025	.945
2503.250	93.656	5.690	8.741	2.491	.188	.370	.892	.091	.943
2503.500	91.740	5.602	6.241	2.501	.187	.390	.913	.085	.950
2503.750	97.373	6.137	8.264	2.516	.212	.513	.953	.030	.947
2504.000	107.398	6.001	8.290	2.482	.264	.600	1.000	.000	1.000
2504.250	115.071	5.646	6.525	2.495	.286	.713	1.000	.000	1.000
2504.500	122.370	5.734	6.046	2.502	.239	.583	.988	.000	.972
2504.750	118.961	5.792	7.721	2.497	.215	.484	.925	.048	.941
2505.000	111.588	6.148	6.181	2.502	.222	.521	.944	.030	.946
2505.250	111.970	5.371	9.543	2.474	.232	.495	.918	.050	.947
2505.500	108.013	3.952	4.798	2.454	.228	.436	.915	.089	.947
2505.750	96.764	3.371	5.017	2.434	.227	.388	.910	.123	.945

LIST

DEPTH	.GR	.RT	.RXO	.RHOB	.NPHIC	.VSHO	.SXOE	.PHIE	.SWEC
2506.000	87.746	2.466	3.888	2.431	.234	.405	.979	.121	.948
2506.250	83.901	1.971	3.214	2.404	.228	.353	1.000	.138	1.021
2506.500	73.978	1.627	2.365	2.368	.214	.220	1.000	.167	1.035
2506.750	59.954	1.579	2.080	2.359	.209	.183	1.000	.173	1.034
2507.000	58.142	1.659	1.965	2.374	.226	.277	1.000	.160	1.030
2507.250	61.662	1.667	2.390	2.352	.254	.334	.974	.169	.946
2507.500	56.735	1.451	2.072	2.291	.258	.212	.947	.212	.941
2507.750	55.460	1.353	1.214	2.295	.246	.176	.969	.212	.945
2508.000	61.454	1.449	2.409	2.355	.238	.279	1.000	.171	1.041
2508.250	63.462	1.790	2.003	2.359	.234	.274	.973	.169	.944
2508.500	77.933	2.249	2.738	2.405	.226	.350	.978	.138	.946
2508.750	90.442	3.234	5.249	2.456	.226	.433	.959	.090	.949
2509.000	95.168	3.773	4.485	2.486	.253	.599	1.000	.000	.999
2509.250	88.535	3.206	5.818	2.453	.259	.547	.981	.028	.954
2509.500	66.651	2.374	3.984	2.402	.223	.329	.963	.140	.940
2509.750	53.498	1.585	2.185	2.358	.212	.191	1.000	.174	1.025
2510.000	48.583	1.329	2.250	2.333	.229	.197	1.000	.188	1.037
2510.250	42.724	1.136	1.374	2.321	.243	.222	1.000	.194	1.086
2510.500	48.953	1.092	1.420	2.310	.254	.239	1.000	.199	1.070
2510.750	46.622	1.121	1.735	2.290	.216	.000	1.000	.234	1.006
2511.000	43.877	1.531	1.384	2.318	.205	.074	.975	.207	.948
2511.250	62.516	1.823	2.912	2.399	.211	.277	1.000	.145	1.072
2511.500	64.178	2.279	5.903	2.401	.204	.258	.982	.145	.955
2511.750	42.545	1.696	3.935	2.350	.199	.123	.990	.183	.975
2512.000	26.046	1.120	1.660	2.328	.231	.193	1.000	.191	1.096
2512.250	25.782	1.232	1.275	2.260	.272	.193	.951	.232	.941
2512.500	24.223	1.419	2.516	2.210	.263	.000	.894	.278	.945
2512.750	16.617	1.407	2.430	2.261	.220	.000	.938	.247	.942
2513.000	17.419	1.288	1.853	2.288	.213	.000	.975	.234	.949
2513.250	20.725	1.278	2.093	2.314	.220	.119	1.000	.205	1.013
2513.500	18.863	1.284	1.878	2.310	.228	.141	.998	.206	.996
2513.750	18.196	1.274	1.847	2.292	.217	.062	.985	.223	.962
2514.000	19.437	1.190	1.708	2.270	.211	.000	.981	.240	.953
2514.250	20.551	1.076	1.349	2.251	.230	.000	.978	.255	.946
2514.500	20.082	1.037	1.199	2.257	.226	.000	.991	.251	.977
2514.750	18.397	1.049	1.238	2.262	.214	.000	.999	.244	.997
2515.000	19.483	1.076	1.251	2.274	.203	.000	1.000	.236	1.020
2515.250	20.872	1.116	1.363	2.284	.189	.000	1.000	.226	1.045
2515.500	20.315	1.241	1.475	2.300	.186	.000	1.000	.219	1.022
2515.750	20.215	1.331	1.495	2.340	.169	.000	1.000	.198	1.095
2516.000	22.838	1.588	1.949	2.378	.128	.000	1.000	.167	1.097
2516.250	24.864	1.540	1.948	2.380	.118	.000	1.000	.162	1.100
2516.500	28.568	1.415	1.865	2.338	.143	.000	1.000	.188	1.098
2516.750	29.524	1.289	1.545	2.313	.157	.000	1.000	.202	1.086
2517.000	27.208	1.323	1.684	2.326	.142	.000	1.000	.191	1.094
2517.250	29.673	1.312	1.672	2.329	.137	.000	1.000	.188	1.097
2517.500	33.380	1.194	1.512	2.295	.156	.000	1.000	.209	1.094
2517.750	31.317	1.102	1.407	2.275	.176	.000	1.000	.224	1.059
2518.000	27.256	1.138	1.433	2.277	.169	.000	1.000	.221	1.059
2518.250	22.543	1.182	1.388	2.294	.155	.000	1.000	.209	1.100
2518.500	19.550	1.188	1.454	2.305	.148	.000	1.000	.202	1.096
2518.750	24.472	1.193	1.434	2.302	.152	.000	1.000	.204	1.097
2519.000	29.969	1.148	1.550	2.290	.161	.000	1.000	.213	1.094
2519.250	32.638	1.032	1.375	2.265	.181	.000	1.000	.231	1.065
2519.500	38.137	.964	1.267	2.251	.192	.000	1.000	.240	1.060
2519.750	37.845	.988	1.226	2.259	.198	.000	1.000	.239	1.051

LIST

DEPTH	.GR	.RT	.RXO	.RHOB	.NPHIC	.VSHO	.SXOE	.PHIE	.SWEC
2520.000	30.916	1.070	1.422	2.280	.174	.000	1.000	.222	1.087
2520.250	30.693	1.137	1.443	2.285	.162	.000	1.000	.215	1.089
2520.500	30.576	1.136	1.452	2.290	.169	.000	1.000	.216	1.084
2520.750	30.128	1.182	1.491	2.303	.162	.000	1.000	.208	1.091
2521.000	32.457	1.149	1.759	2.283	.162	.000	1.000	.216	1.078
2521.250	37.673	1.027	1.162	2.247	.201	.000	1.000	.245	1.005
2521.500	38.347	.986	1.143	2.235	.215	.000	.995	.255	.986
2521.750	35.284	1.070	1.312	2.249	.188	.000	1.000	.239	1.009
2522.000	38.956	1.211	1.471	2.284	.178	.000	1.000	.222	1.022
2522.250	45.367	1.247	1.781	2.297	.185	.000	1.000	.220	1.016
2522.500	49.040	1.172	1.291	2.267	.199	.000	.989	.237	.973
2522.750	50.841	1.144	1.283	2.263	.224	.000	.976	.248	.941
2523.000	50.591	1.167	1.332	2.262	.237	.067	.971	.241	.949
2523.250	50.462	1.175	1.313	2.267	.224	.000	.973	.247	.943
2523.500	59.837	1.094	1.193	2.258	.224	.000	.982	.250	.955
2523.750	70.837	1.083	1.165	2.245	.212	.000	.983	.250	.958
2524.000	65.628	1.243	1.375	2.274	.197	.000	.984	.233	.960
2524.250	48.065	1.436	1.669	2.306	.192	.000	.979	.219	.949
2524.500	34.602	1.438	1.746	2.313	.185	.000	.988	.214	.970
2524.750	28.111	1.158	1.458	2.273	.210	.000	.988	.239	.971
2525.000	26.259	1.025	1.195	2.247	.224	.000	.988	.254	.970
2525.250	26.047	.992	1.214	2.249	.220	.000	.998	.251	.995
2525.500	27.201	1.012	1.219	2.257	.225	.000	.996	.250	.989
2525.750	28.233	1.011	1.234	2.258	.203	.000	1.000	.241	1.027
2526.000	23.923	1.075	1.370	2.274	.177	.000	1.000	.225	1.068
2526.250	24.967	1.136	1.447	2.298	.174	.000	1.000	.215	1.087
2526.500	24.239	1.139	1.475	2.302	.173	.000	1.000	.213	1.095
2526.750	27.837	1.125	1.382	2.286	.179	.000	1.000	.222	1.061
2527.000	39.873	1.123	1.403	2.285	.193	.000	1.000	.227	1.034
2527.250	44.396	1.179	1.693	2.295	.206	.000	1.000	.229	1.002
2527.500	33.282	1.284	1.561	2.307	.172	.000	1.000	.211	1.041
2527.750	24.739	1.344	1.816	2.335	.141	.000	1.000	.188	1.095
2528.000	19.607	1.405	1.905	2.344	.132	.000	1.000	.181	1.093
2528.250	18.077	1.540	2.062	2.363	.116	.000	1.000	.167	1.092
2528.500	20.271	1.932	2.832	2.396	.107	.000	1.000	.151	1.096
2528.750	20.541	2.194	3.239	2.412	.110	.000	1.000	.147	1.093
2529.000	19.190	2.042	2.736	2.403	.118	.000	1.000	.154	1.093
2529.250	19.907	1.728	2.512	2.390	.131	.000	1.000	.164	1.095
2529.500	18.981	1.515	2.206	2.382	.142	.000	1.000	.171	1.090
2529.750	19.159	1.421	2.096	2.368	.149	.000	1.000	.180	1.093
2530.000	20.770	1.380	1.939	2.363	.162	.000	1.000	.000	1.000
2530.250	24.006	1.323	1.974	2.362	.168	.000	1.000	.000	1.000
2530.500	33.001	1.325	1.802	2.359	.175	.000	1.000	.000	1.000
2530.750	40.732	1.688	2.536	2.209	.297	.000	1.000	.000	1.000
2531.000	59.563	3.430	44.882	1.928	.433	.000	1.000	.000	1.000
2531.250	87.320	12.662	58.691	2.109	.349	.000	1.000	.000	1.000
2531.500	96.933	19.316	13.022	2.491	.234	.000	1.000	.000	1.000
2531.750	93.307	13.566	11.462	2.507	.228	.000	1.000	.000	1.000
2532.000	84.328	12.584	16.032	2.513	.217	.000	1.000	.000	1.000
2532.250	65.925	7.786	9.568	2.470	.203	.347	.793	.104	.941
2532.500	56.147	3.376	3.861	2.356	.199	.075	.861	.186	.946
2532.750	75.460	2.940	2.188	2.402	.194	.224	.931	.146	.945
2533.000	93.953	5.641	11.001	2.542	.213	.579	.999	.000	.997
2533.250	79.942	7.704	8.931	2.481	.197	.352	.809	.098	.943
2533.500	61.516	3.959	1.136	2.369	.209	.142	.839	.172	.949
2533.750	83.848	3.920	7.738	2.422	.276	.539	.948	.037	.948

LIST

DEPTH	.GR	.RT	.RXO	.RHOB	.NPHIC	.VSHO	.SXOE	.PHIE	.SWEC
2534.000	106.622	7.488	14.163	2.494	.301	.765	1.000	.000	1.000
2534.250	112.008	16.204	12.238	2.498	.290	.735	1.000	.000	1.000
2534.500	108.656	14.508	12.963	2.498	.291	.739	1.000	.000	1.000
2534.750	101.329	13.708	12.441	2.496	.291	.731	1.000	.000	1.000
2535.000	96.468	14.451	12.074	2.429	.322	.699	1.000	.000	1.000
2535.250	100.344	15.578	15.503	2.419	.333	.715	1.000	.000	1.000
2535.500	95.738	12.662	15.844	2.460	.243	.474	.789	.063	.940
2535.750	79.075	8.115	6.966	2.462	.152	.141	.828	.119	.944
2536.000	67.395	5.679	5.048	2.459	.159	.221	.882	.112	.944
2536.250	64.384	5.734	3.067	2.443	.165	.177	.865	.124	.950
2536.500	48.656	4.111	3.768	2.431	.166	.183	.912	.131	.942
2536.750	37.166	2.859	2.421	2.369	.177	.083	.910	.175	.949
2537.000	38.743	1.983	1.951	2.336	.197	.084	.942	.195	.941
2537.250	61.514	2.688	1.672	2.369	.247	.346	.885	.159	.950
2537.500	95.806	4.029	6.450	2.461	.255	.551	.971	.024	.940
2537.750	114.049	9.798	10.009	2.537	.225	.612	1.000	.000	1.000
2538.000	112.208	12.253	10.346	2.532	.210	.512	.887	.027	.950
2538.250	107.854	11.638	11.234	2.521	.200	.451	.819	.053	.944
2538.500	111.253	11.172	9.726	2.534	.202	.519	.906	.024	.941
2538.750	117.751	11.488	12.050	2.549	.216	.607	1.000	.000	1.000
2539.000	118.436	11.109	12.433	2.541	.201	.532	.926	.019	.946
2539.250	115.892	8.818	7.571	2.514	.195	.447	.855	.057	.941
2539.500	99.086	7.372	5.603	2.476	.197	.342	.814	.101	.943
2539.750	65.741	3.960	4.494	2.394	.161	.054	.885	.162	.946
2540.000	43.845	3.071	2.595	2.380	.143	.000	.925	.173	.942
2540.250	50.764	2.689	1.798	2.424	.135	.000	.995	.154	.988
2540.500	72.437	4.022	2.478	2.465	.153	.210	.972	.109	.942
2540.750	99.833	5.999	7.848	2.499	.187	.381	.890	.086	.948
2541.000	113.168	9.152	10.462	2.497	.195	.000	1.000	.000	1.000
2541.250	102.353	10.482	11.898	2.305	.227	.000	1.000	.000	1.000
2541.500	85.990	13.263	11.258	2.052	.366	.000	1.000	.000	1.000
2541.750	86.600	13.377	10.688	2.115	.427	.000	1.000	.000	1.000
2542.000	87.768	6.449	10.805	2.398	.288	.000	1.000	.000	1.000
2542.250	69.103	3.822	8.337	2.414	.215	.000	1.000	.000	1.000
2542.500	49.091	2.741	3.607	2.360	.201	.000	1.000	.000	1.000
2542.750	37.451	1.829	1.902	2.330	.213	.132	.948	.194	.943
2543.000	28.459	1.185	1.490	2.316	.225	.144	1.000	.202	1.055
2543.250	26.685	1.158	1.688	2.285	.226	.077	.994	.226	.986
2543.500	28.359	1.315	1.916	2.272	.206	.000	.964	.237	.943
2543.750	27.560	1.385	1.824	2.272	.199	.000	.959	.235	.950
2544.000	22.903	1.364	1.916	2.294	.202	.000	.973	.228	.944
2544.250	22.220	1.277	1.902	2.313	.188	.000	1.000	.215	1.023
2544.500	22.523	1.176	1.866	2.305	.177	.000	1.000	.214	1.072
2544.750	23.641	1.112	1.650	2.278	.170	.000	1.000	.221	1.066
2545.000	21.481	1.114	1.500	2.278	.172	.000	1.000	.222	1.062
2545.250	20.188	1.154	1.532	2.291	.197	.000	1.000	.227	1.019
2545.500	21.139	1.154	1.424	2.290	.206	.000	1.000	.231	1.002
2545.750	22.524	1.073	1.399	2.274	.204	.000	1.000	.236	1.017
2546.000	23.496	1.050	1.157	2.263	.208	.000	1.000	.241	1.005
2546.250	22.926	1.075	1.314	2.268	.184	.000	1.000	.230	1.042
2546.500	22.170	1.125	1.309	2.280	.172	.000	1.000	.221	1.061
2546.750	21.385	1.228	1.454	2.298	.173	.000	1.000	.215	1.044
2547.000	24.168	1.300	1.617	2.298	.167	.000	1.000	.212	1.027
2547.250	23.779	1.256	1.653	2.275	.169	.000	1.000	.221	1.001
2547.500	19.631	1.134	1.353	2.271	.162	.000	1.000	.220	1.060
2547.750	19.934	1.129	1.347	2.279	.167	.000	1.000	.219	1.067

LIST

DEPTH	.GR	.RT	.RXO	.RHOB	.NPHIC	.VSHO	.SXOE	.PHIE	.SWEC
2548.000	22.267	1.200	1.413	2.280	.175	.000	1.000	.222	1.022
2548.250	23.442	1.407	1.754	2.293	.150	.000	1.000	.207	1.013
2548.500	24.317	1.502	1.846	2.315	.143	.000	1.000	.196	1.034
2548.750	25.219	1.388	1.802	2.328	.158	.000	1.000	.198	1.066
2549.000	24.171	1.233	1.459	2.307	.168	.000	1.000	.209	1.069
2549.250	24.656	1.159	1.287	2.283	.169	.000	1.000	.218	1.056
2549.500	22.900	1.139	1.288	2.281	.184	.000	1.000	.226	1.032
2549.750	20.529	1.130	1.277	2.272	.197	.000	.999	.234	.998
2550.000	21.381	1.105	1.258	2.262	.188	.000	1.000	.234	1.010

PE603720

This is an enclosure indicator page.
The enclosure PE603720 is enclosed within the container PE905435 at this location in this document.

The enclosure PE603720 has the following characteristics:

ITEM_BARCODE =	PE603720
CONTAINER_BARCODE =	PE905435
NAME =	Drummer 1 Log Analysis 1:200 (encl. app 3 - Vol 2 WCR)
BASIN =	GIPPSLAND
PERMIT =	VIC/P1
TYPE =	WELL
SUBTYPE =	WELL_LOG
DESCRIPTION =	Drummer 1 Log Analysis. (enclosure from appendix 3 of Vol 2, WCR).
REMARKS =	
DATE_CREATED =	
DATE_RECEIVED =	12/06/87
W_NO =	W918
WELL_NAME =	Drummer-1
CONTRACTOR =	Esso Australia Ltd
CLIENT_OP_CO =	Esso Australia Ltd

(Inserted by DNRE - Vic Govt Mines Dept)

APPENDIX 4

APPENDIX 4

APPENDIX 4

WIRELINE TEST REPORT

Doc. 2413L/52

INTRODUCTION

An RFT survey was performed in Drummer-1 to investigate the extent of vertical communication in the well and to establish the communication pattern across the major fault to the north of the well.

SUMMARY AND CONCLUSIONS

1. There is no evidence of any significant barrier to vertical hydraulic communication in the well, indicating that the sealing unit seen in Rockling-1 has not been intersected.

2. The pressures measured are equivalent to those observed in both the M-1.1.1 unit at Cobia and the South Fortescue FM-1.3, currently being produced by CF-17 and CF-8, suggesting that either or both of these units could be communicating via the aquifer with the hydraulic system intersected by Drummer-1.

3. There is no evidence of any pressure communication between the main northern Fortescue FM-1.3 system and the Drummer sands.

DISCUSSION

Seven valid pretests were obtained in Drummer-1 spanning the whole of the sand interval intersected. This data is summarised in Table 1, and the formation pressure data is plotted in Figure 1, along with the results of the Rockling-1 RFT survey from January 1979. Figure 2 shows the pressure data compared with other relevant pressure data. Table 2 is a copy of the data collected by the geologist at the wellsite.

Several important points can be obtained from figure 1:

1. All the Drummer pressures lie on a single line with a water gradient of 1.42 psi/m. This suggests that there are no barriers to vertical hydraulic communication in the well, unlike the Rockling RFT survey which saw a 15 psi pressure differential across a unit similar to the FM-1.4/M-1.02.

2. The pressures in Drummer-1 have been drawn down by 46 psi relative to the pressure observed in the lower hydraulic system in Rockling-1.

Figure 2 shows the two Rockling pressures and the Drummer-1 pressure datumed to 2500 m TVDss and compared with the pressures measured in other wells in the region. Recognising the effect of location on pressure drawdown it's reasonable to conclude that Drummer-1 may be communicating with the Halibut/Cobia M-1.1.1 unit.

Similarly, the Drummer-1 pressures are sufficiently close to the pressures measured in CF-17 to conclude that there may be some communication across the fault between the aquifer of the producing sands in CF-17 and the sands intersected by Drummer-1. This assumes of course that the producing sand in CF-17 still exists as far south as the fault.

Note that the drawdown inferred from the Rockling and Drummer pressures is less than that observed in both the Halibut M-1.1.1 and the Mackerel reservoir over the same period. This is probably due to the relative isolation of Drummer-1 and Rockling from the producing regions of Halibut, Cobia, Fortescue and Mackerel.

(4764f:52)

Table 1

Drummer-1 RFT Survey

October 13, 1985

SEAT	DEPTH (mTVDss)	FORMATION PRESSURE (PSIa)	COMMENT
1	2534	3533.9	Valid
2	2524	3521.4	Valid
3	2504.5	3491.9	Valid
4	2494	3476.7	Valid
5	2472.2	3444.7	Valid
6	2451	3415.2	Valid
7	2434	-	Tight, plugged
8	2435.1	-	Tight, plugged
9	2432	-	Plugged
10	2432	-	Plugged
11	2441	3401.1	Valid

(4764f:53)

A4 fig 1 and 2 to follow

PE905165

This is an enclosure indicator page.
The enclosure PE905165 is enclosed within the container PE905435 at this location in this document.

The enclosure PE905165 has the following characteristics:

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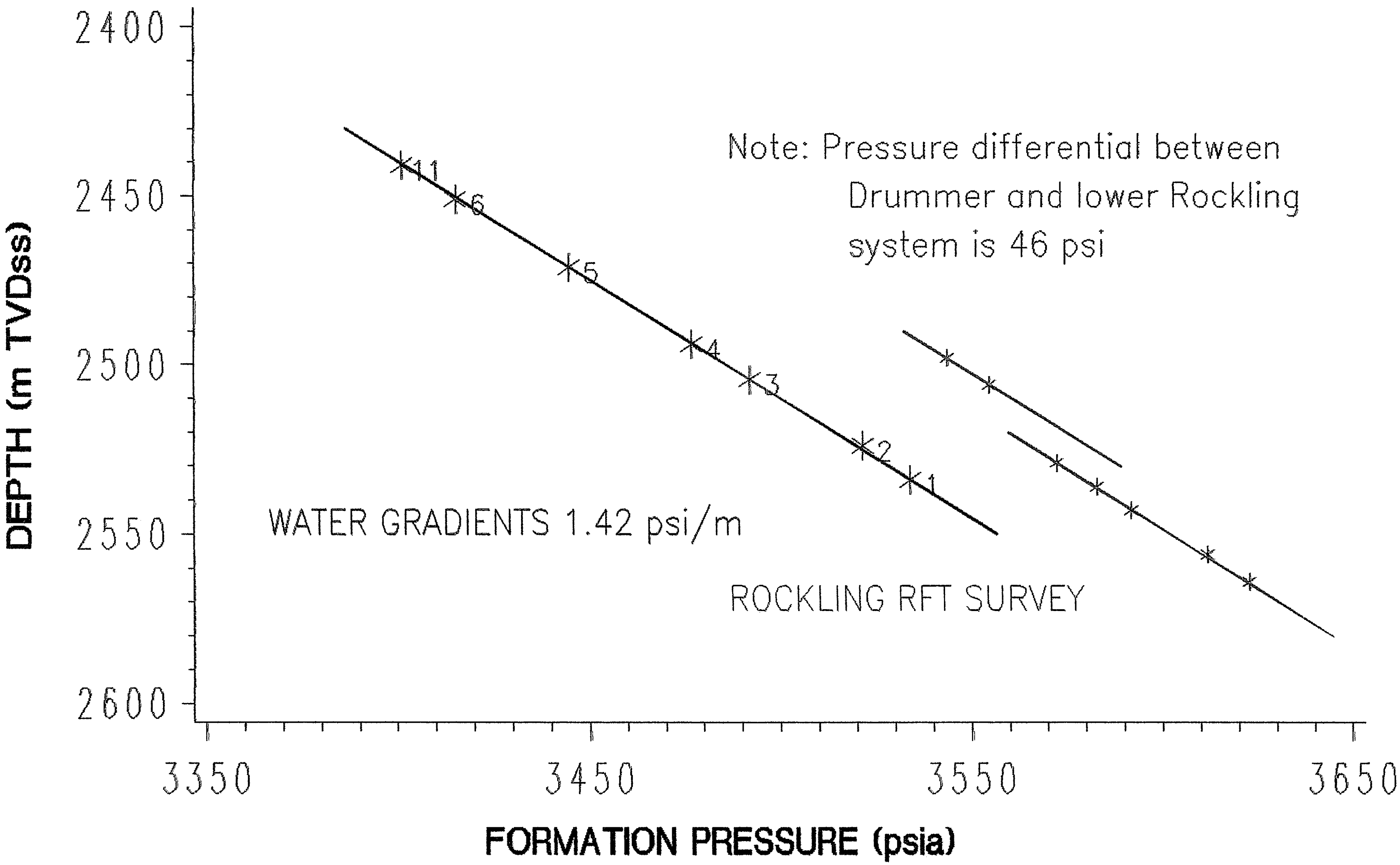
CONTAINER_BARCODE =	PE905435
NAME =	Drummer-1 RFT Survey
BASIN =	GIPPSLAND
PERMIT =	VIC/P1
TYPE =	WELL
SUBTYPE =	RFT
DESCRIPTION =	Drummer-1 RFT Survey of depth verses formation pressure. From appendix 4 of WCR volume 2.
REMARKS =	This item contains colour.
DATE_CREATED =	
DATE_RECEIVED =	12/06/1987
W_NO =	W918
WELL_NAME =	Drummer-1
CONTRACTOR =	
CLIENT_OP_CO =	Esso Australia Limited

(Inserted by DNRE - Vic Govt Mines Dept)

FIG. 1: DRUMMER RFT SURVEY

13-10-85



RAHM 30MAR87

DEPT. NAT. RES & ENV PE905165

PE905166

This is an enclosure indicator page.
The enclosure PE905166 is enclosed within the container PE905435 at this location in this document.

The enclosure PE905166 has the following characteristics:

ITEM_BARCODE =	PE905166
CONTAINER_BARCODE =	PE905435
NAME =	Pressure Trend Data
BASIN =	GIPPSLAND
PERMIT =	VIC/P1
TYPE =	WELL
SUBTYPE =	DIAGRAM
DESCRIPTION =	Drummer-1 Pressure Trend Data, Reservoir Pressures @ 2500 m ss, Graph of Pressure verses Beginning of Year. From appendix 4 of WCR volume 2.
REMARKS =	This item contains colour.
DATE_CREATED =	
DATE_RECEIVED =	12/06/1987
W_NO =	W918
WELL_NAME =	Drummer-1
CONTRACTOR =	
CLIENT_OP_CO =	Esso Australia Limited

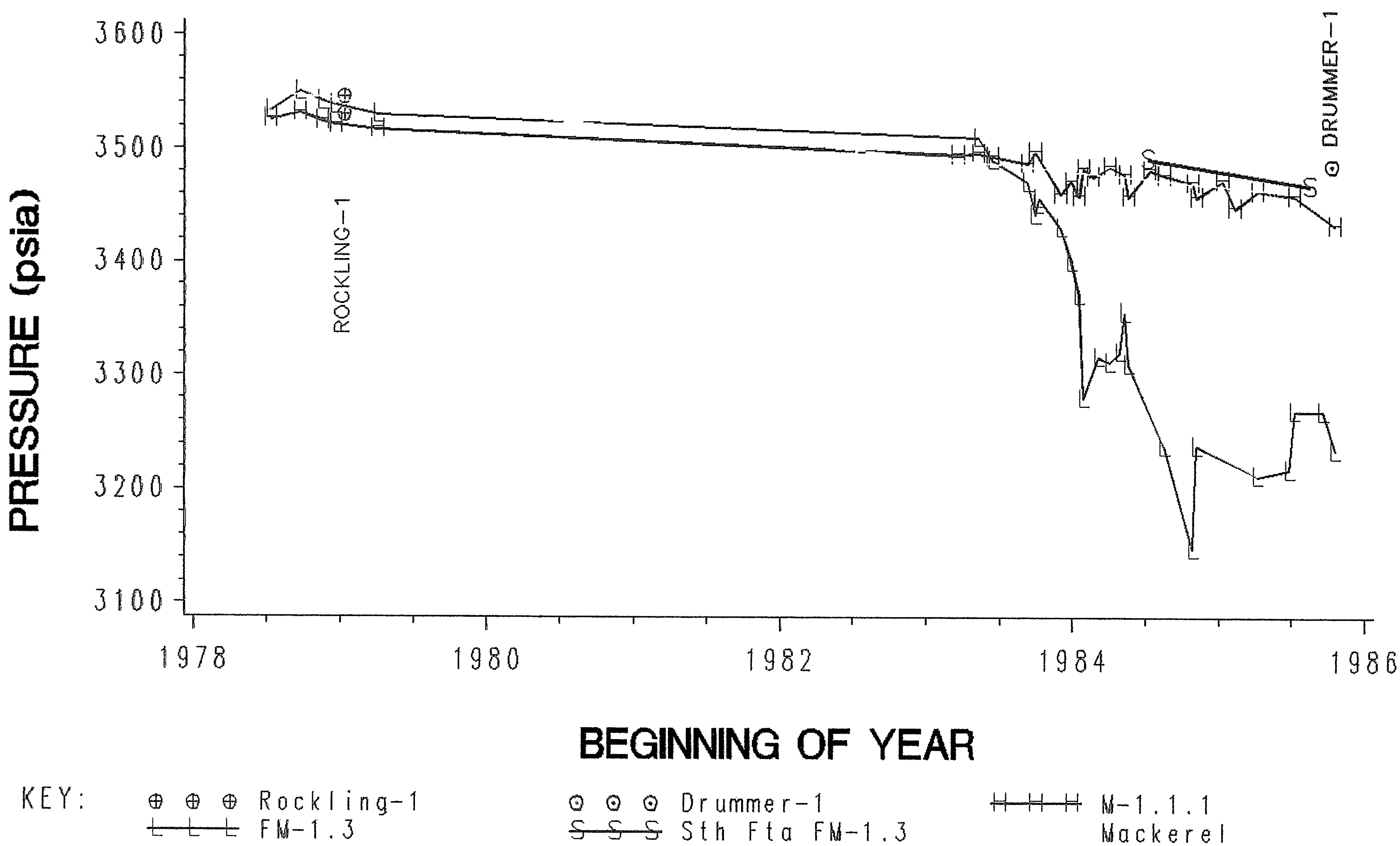
(Inserted by DNRE - Vic Govt Mines Dept)

Figure 2:

DEPT. NAT. RES & ENV
PE905166

PRESSURE TREND DATA

RESERVOIR PRESSURES @ 2500m ss



30MAR87

APPENDIX 5

GEOCHEMICAL REPORT

DRUMMER-1, GIPPSLAND

VICTORIA

by

T.R. BOSTWICK

Sample handling and Analyses by:

- D.M. Hill	)	
- D.M. Ford	)	
- J. McCardle	)	ESSO AUSTRALIA LTD.
- H. Schiller	)	
- M.A. Sparke	)	
- A.C. Cook	)	UNIVERSITY OF WOLLONGONG

Esso Australia Ltd.
Geochemical Report

June, 1986

2294L

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APPENDIX

Introduction

Canned cuttings and sidewall cores from the Drummer-1 well, Gippsland Basin were analysed to determine the hydrocarbon source characterstics of the drilled section. The cuttings were composited over 15-metre intervals from 235 mKB to total Depth (T.D.) at 2571 mKB. Alternate cuttings samples were analysed for their headspace C_{1-4} cuttings gas concentrations. Selected sidewall cores were analyzed for total organic carbon (TOC), Rock Eval pyrolysis yields, kerogen isolation and elemental analysis, and vitrinite reflectance.

The results of these analyses are recorded in Tables 1 through 5, and Figures 1 through 5.

Discussion of Results and Interpretations

Richness

Cuttings gas yields (Table 1, Figure 1) are moderately high in the 550-1690 mKB and 2485-2545 mKB intervals. The methane rich gas in the shallower interval is probably biogenic gas. The yields in the 2485-2545 mKB (Latrobe Group) section are most likely indicative of fair-good source interval.

Total organic carbon measurements (Table 2) confirm the presence of relatively organic-rich (greater than 1% TOC) Latrobe Gróup sediments in the 2448-2539 mKB interval, and pyrolysis S_2 yields (Table 3a) indicate that fair to good oil source potential is present at the 2478.8 mKB, 2404.5 mKB, 2531.6 mKB, and 2534.3 mKB levels.

Hydrocarbon Type

According to the hydrogen indicies (Table 3b) the Latrobe Group sediments contain Type III, terrestrial organic matter. Typically, Type III organic matter is considered gas-prone however, the higher hydrogen indicies encountered at the 2478.8 mKB, 2504.5 mKB, 2531.6 mKB and 2534.3 mKB levels suggest that some condensate/waxy oil potential may be possible.

The hydrogen: carbon (H/C) and approximate oxygen: carbon (O/C) atomic ratios (Table 4b, Figure 4) confirm the presence of land-derived, Type III kerogen in the Latrobe sediments. (Please note that the O/C atomic ratio is approximate since the oxygen content was calculated by difference, and sulphur content which may be up to a few percent was not determined). As with the hydrogen indicies, the more hydrogen-rich (higher H/C ratios) kerogens may have some condensate/waxy oil potential (e.g. at 2504.5 mKB, 2511.5 mKB, 2531.6 mKB and 2534.3 mKB).

Maturity

Vitrinite reflectance measurements (Table 5, Figure 5) indicate that at T.D. (2571 mKB) the section is still immature. This is supported by the TMAX measurements (Table 3a) and the atomic O/C ratios (Table 4b).

CONCLUSIONS

1. The section encountered by the Drummer-1 well is immature to T.D. at 2571 mKB.

2. Fair to good hydrocarbon source potential is present in certain portions of the Latrobe Group sediments.

3. Gas appears to be the expected hydrocarbon from the section, but some condensate/waxy oil potential is also possible.

APPENDIX

Detailed Vitrinite Reflectance and
Exinite Fluorescence Data - Report by
A.C. Cook

2294L:5

DRUMMER NO. 1

KK No.	Esso No.	Depth m	$\bar{R}_v max$ %	Range $R_v max$ %	N	Description Including Exinite Fluorescence
x3944	77864 D	2427.56 SWC 30	0.59	0.48-0.63	5	Rare sporinite, orange. (Silty carbonate. Dom rare, I>V=E. All macerals rare. Forams abundant. Moderate carbonate fluorescence. Most of vitrinite shows evidence of reworking. Pyrite common.)
		$\bar{R}_I$	1.47	0.90-2.28	7	
x3945	77863 J	2498.98 SWC 10	0.56	0.43-0.65	25	Common sporinite and liptodetrinite, yellow, yellow orange to orange, sparse cutinite, yellow to dull orange, rare resinite, yellow to orange, rare fluorinite, yellowish green. (Sandy siltstone. Dom common, E>V>I. Exinite and vitrinite common, inertinite sparse. ?Oil droplets with strong green fluorescence present. Pyrite major.)
x3946	77863 C	2534.25 SWC 3	0.55	0.46-0.62	30	Common sporinite and liptodetrinite, yellow, yellow orange to dull orange, sparse cutinite, yellow to yellow orange, sparse resinite, yellow to yellow orange, rare fluorinite, green, rare ?oil droplets, green. (Sandy siltstone. Dom abundant, V>E>I. Vitrinite abundant, exinite and inertinite common. Pyrite abundant.)

FIGURE 1a

C_{1-4} CUTTINGS GAS LOG

DRUMMER 1

GIPPSLAND BASIN

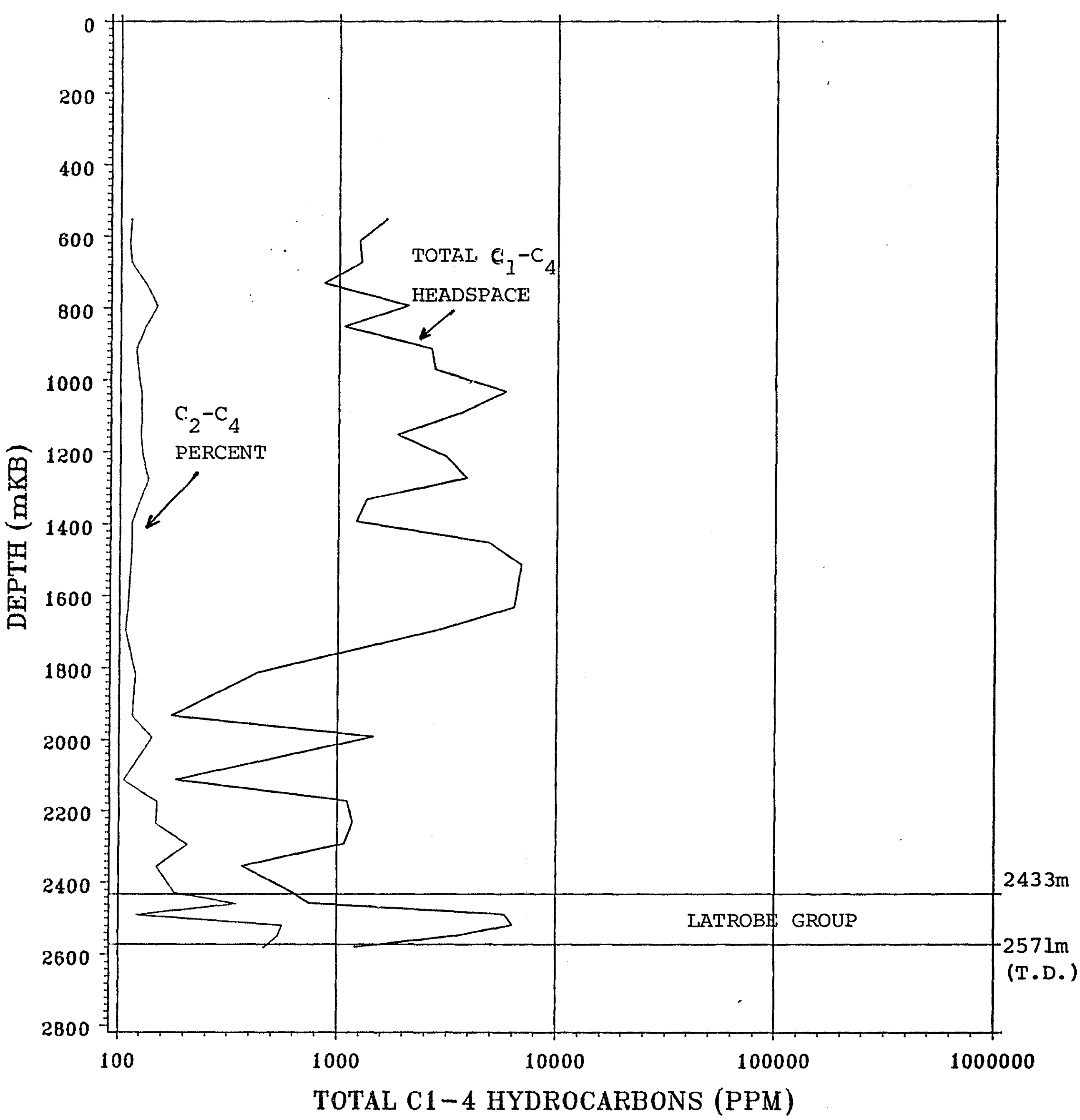


FIGURE 1b

C_{1-4} CUTTINGS GAS LOG

DRUMMER 1

GIPPSLAND BASIN

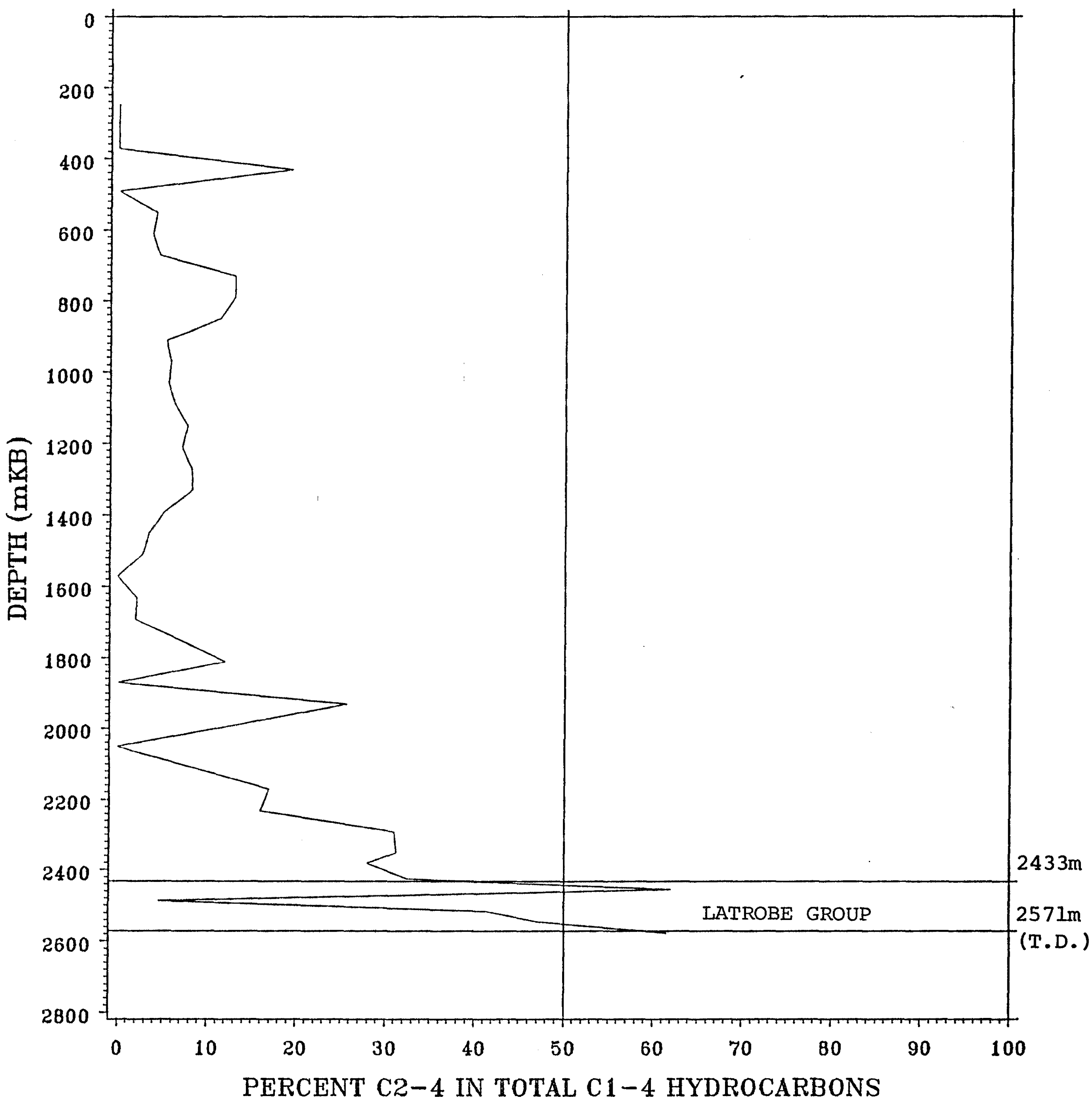
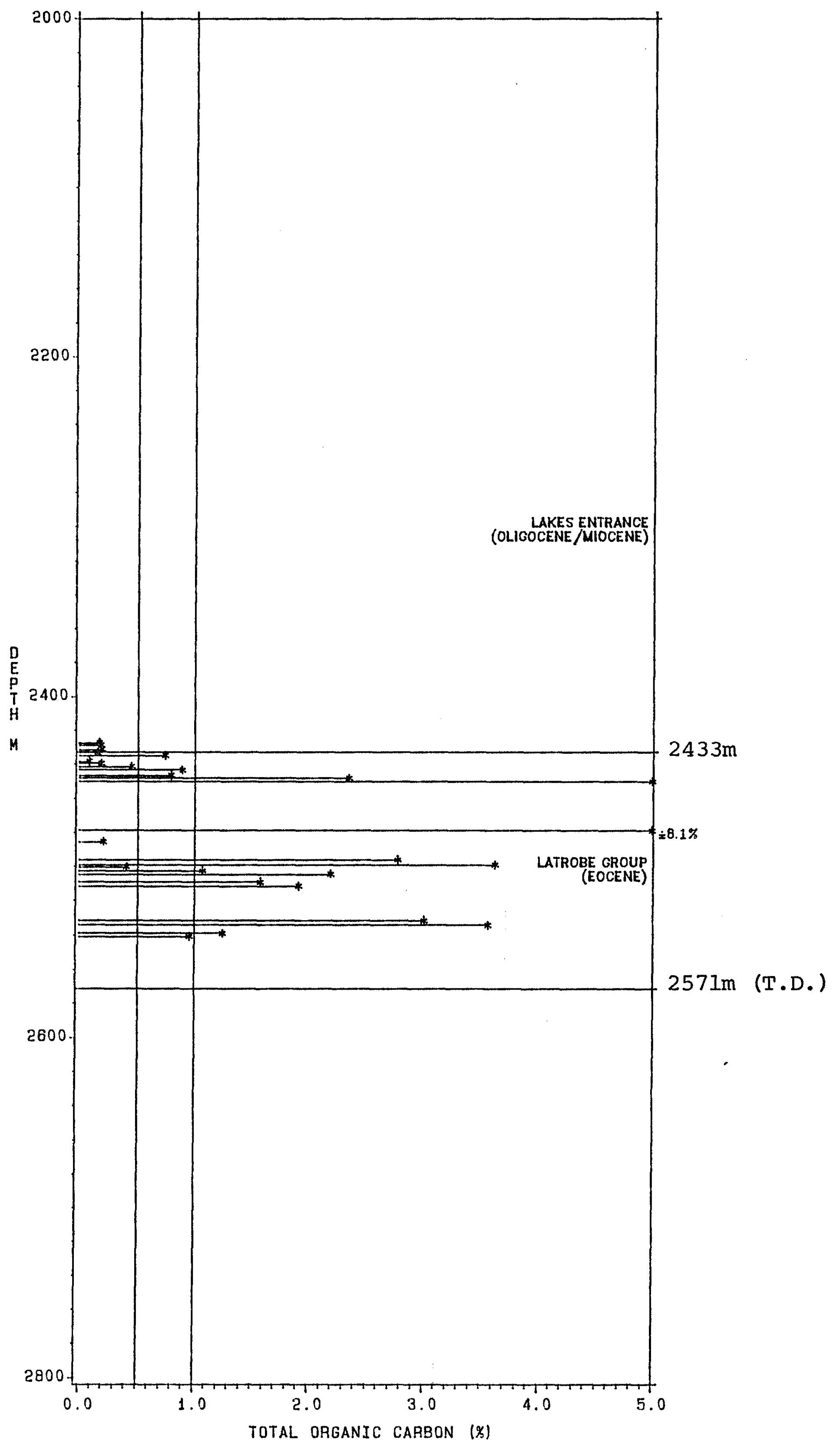


FIGURE 2

TOTAL ORGANIC CARBON
DRUMMER 1
GIPPSLAND BASIN



(ALL DEPTHS ARE M.D.K.B.)

FIGURE 3

ROCKEVAL MATURATION PLOT

DRUMMER 1

GIPPSLAND BASIN

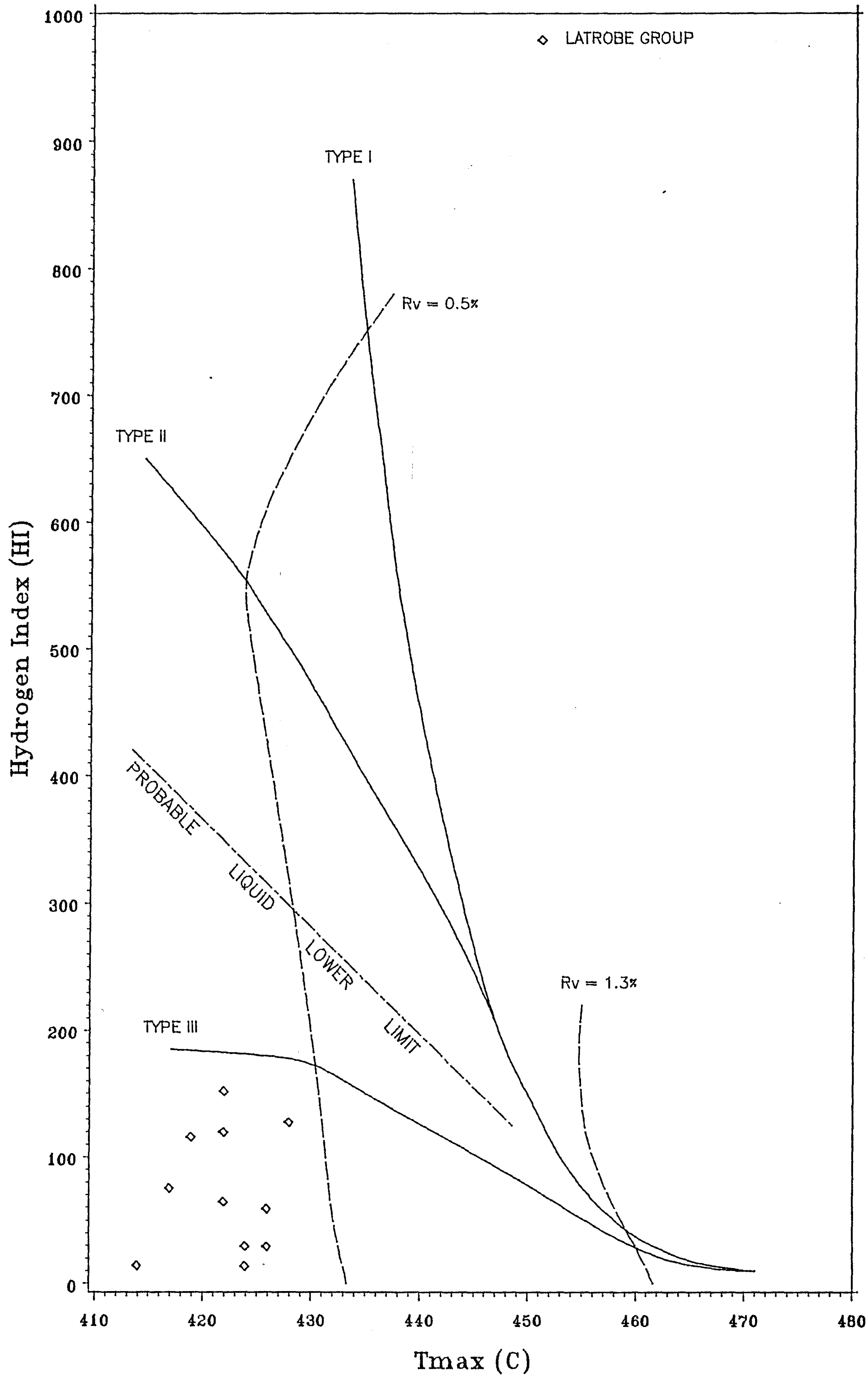


FIGURE 4

KEROGEN TYPE

DRUMMER 1

GIPPSLAND BASIN

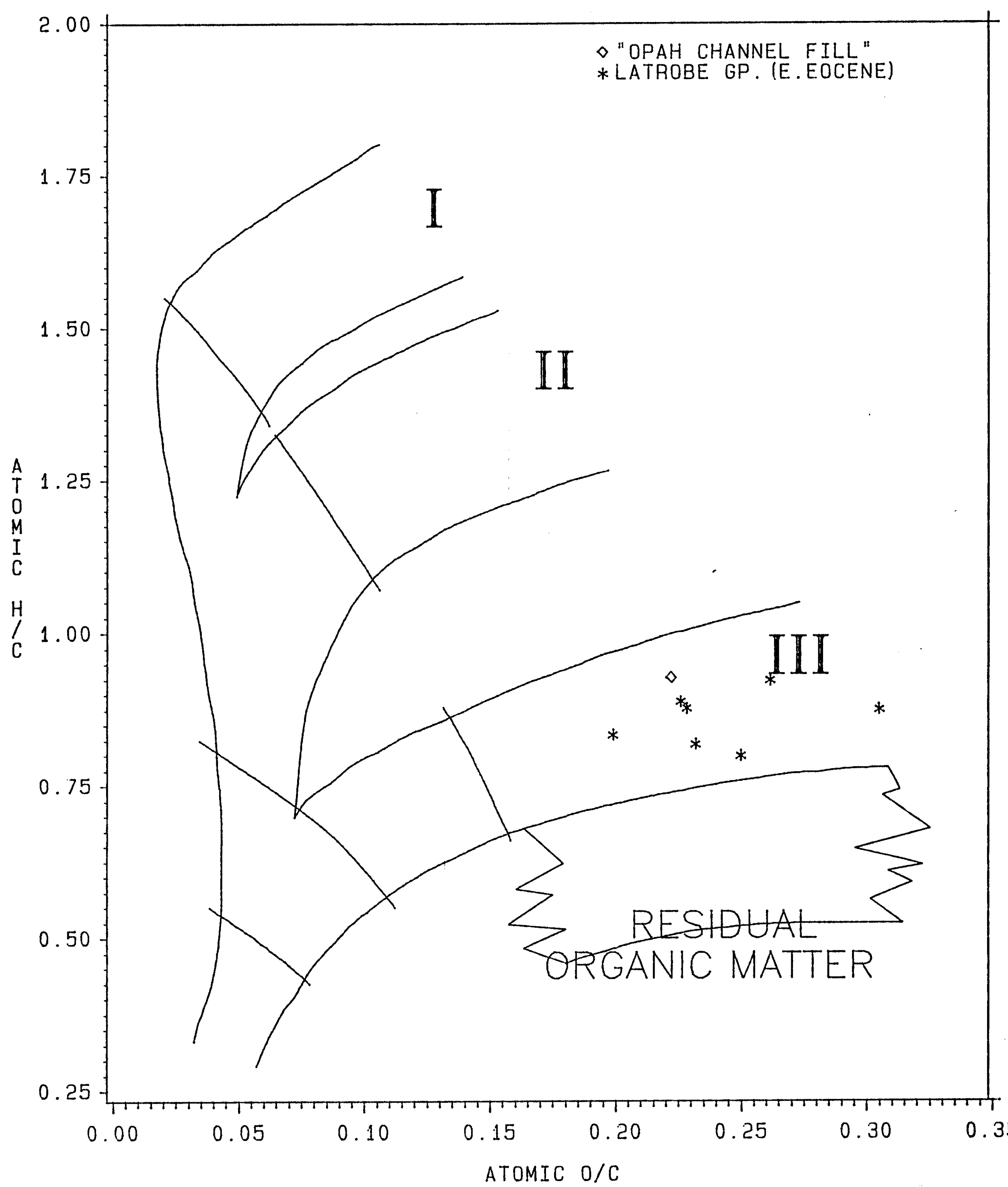
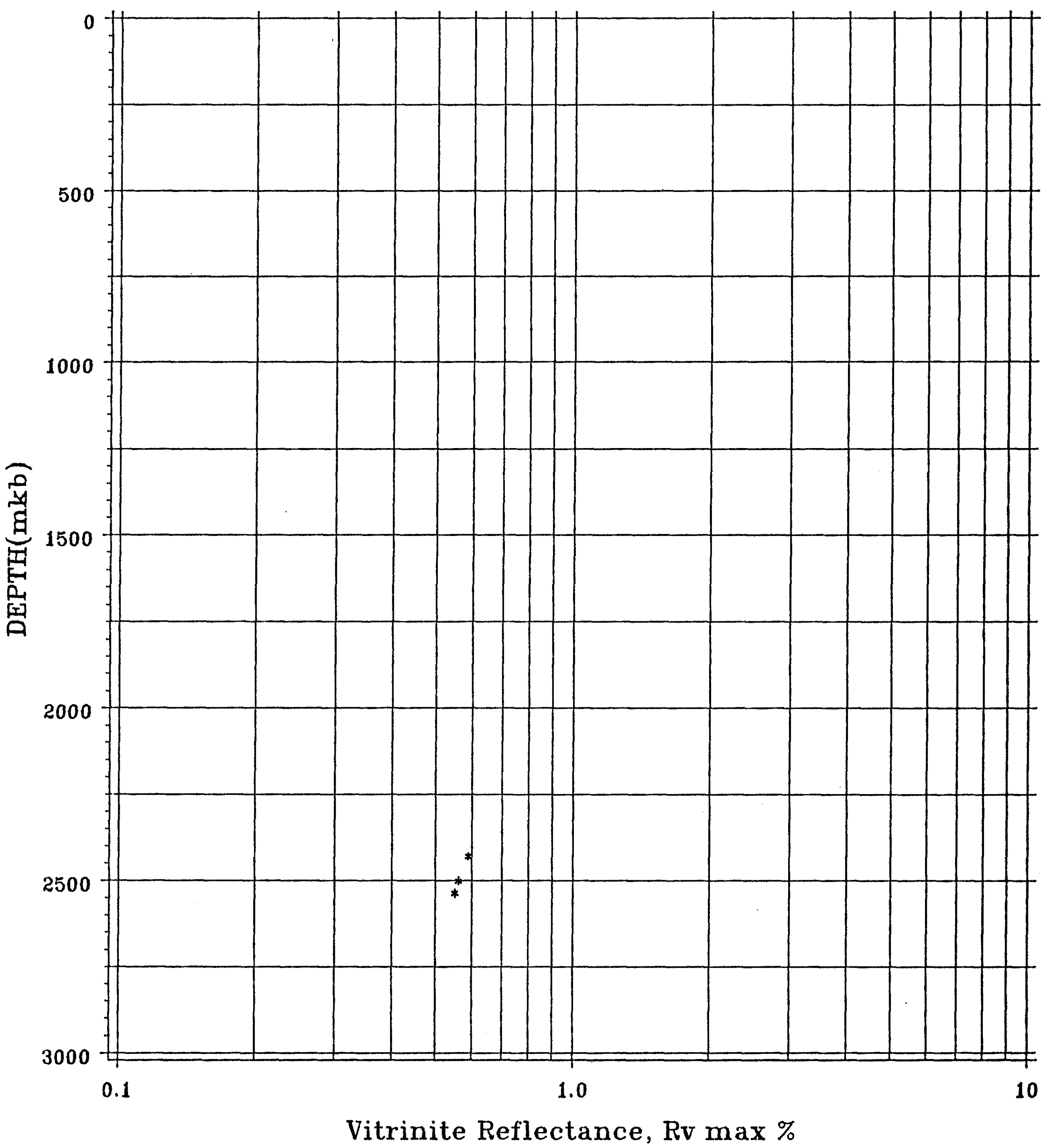


FIGURE 5

VITRINITE REFLECTANCE VS. DEPTH
DRUMMER 1
GIPPSLAND BASIN



C1-C4 HYDROCARBON ANALYSES

REPORT A - HEADSPACE GAS

- GIPPSLAND
- DRUMMER 1

NO.	DEPTH	GAS CONCENTRATION (VOLUME GAS PER MILLION VOLUMES CUTTINGS) METHANE C1	ETHANE C2	PROPANE C3	IBUTANE IC4	NBUTANE C4	WET C2-C4	TOTAL C1-C4	WET/TOTAL PERCENT	GAS COMPOSITION (PERCENT) TOTAL GAS M	TOTAL GAS E	TOTAL GAS P	TOTAL GAS IB	TOTAL GAS NB	WET GAS E	WET GAS P	WET GAS IB	WET GAS NB
A	250.00	0	0	0	0	0	0	0	.00	0.	0.	0.	0.	0.	0.	0.	0.	0.
C	310.00	4	1	1	0	1	3	7	42.86	57.	14.	14.	0.	14.	33.	33.	0.	33.
E	370.00	6	1	1	0	0	2	8	25.00	75.	13.	13.	0.	0.	50.	50.	0.	0.
G	430.00	37	5	2	2	0	9	46	19.57	80.	11.	4.	4.	0.	56.	22.	22.	0.
I	490.00	0	0	2	0	0	2	2	100.00	0.	0.	100.	0.	0.	0.	100.	0.	0.
K	550.00	1586	35	18	12	8	73	1659	4.40	96.	2.	1.	1.	0.	48.	25.	16.	11.
M	610.00	1198	38	7	2	1	48	1246	3.85	96.	3.	1.	0.	0.	79.	15.	4.	2.
O	670.00	1213	49	7	3	1	60	1273	4.71	95.	4.	1.	0.	0.	82.	12.	5.	2.
Q	730.00	740	91	11	8	2	112	852	13.15	87.	11.	1.	1.	0.	81.	10.	7.	2.
S	790.00	1823	230	23	14	8	275	2098	13.11	87.	11.	1.	1.	0.	84.	8.	5.	3.
U	850.00	933	66	36	12	6	120	1053	11.40	89.	6.	3.	1.	1.	55.	30.	10.	5.
W	910.00	2524	62	54	20	8	144	2668	5.40	95.	2.	2.	1.	0.	43.	38.	14.	6.
Y	970.00	2603	53	79	25	8	165	2768	5.96	94.	2.	3.	1.	0.	32.	48.	15.	5.
A	1030.00	5536	169	124	30	10	333	5869	5.67	94.	3.	2.	1.	0.	51.	37.	9.	3.
C	1090.00	3366	79	112	32	11	234	3600	6.50	93.	2.	3.	1.	0.	34.	48.	14.	5.
E	1150.00	1716	34	60	33	20	147	1863	7.89	92.	2.	3.	2.	1.	23.	41.	22.	14.
G	1210.00	2881	44	98	57	25	224	3105	7.21	93.	1.	3.	2.	1.	20.	44.	25.	11.
I	1270.00	3573	102	128	59	37	326	3899	8.36	92.	3.	3.	2.	1.	31.	39.	18.	11.
K	1330.00	1234	44	41	18	10	113	1347	8.39	92.	3.	3.	1.	1.	39.	36.	16.	9.
M	1390.00	1147	21	21	15	6	63	1210	5.21	95.	2.	2.	1.	0.	33.	33.	24.	10.
O	1450.00	4751	69	61	27	15	172	4923	3.49	97.	1.	1.	1.	0.	40.	35.	16.	9.
Q	1510.00	6699	75	74	29	17	195	6894	2.83	97.	1.	1.	0.	0.	38.	38.	15.	9.
S	1570.00	0	0	0	0	0	0	0	.00	0.	0.	0.	0.	0.	0.	0.	0.	0.
U	1630.00	6241	50	55	26	14	145	6386	2.27	98.	1.	1.	0.	0.	34.	38.	18.	10.
W	1690.00	2875	21	22	10	7	60	2935	2.04	98.	1.	1.	0.	0.	35.	37.	17.	12.
A	1810.00	381	12	20	14	7	53	434	12.21	88.	3.	5.	3.	2.	23.	38.	26.	13.
C	1870.00	0	0	0	0	0	0	0	.00	0.	0.	0.	0.	0.	0.	0.	0.	0.
E	1930.00	129	10	19	13	3	45	174	25.86	74.	6.	11.	7.	2.	22.	42.	29.	7.
G	1990.00	1275	48	78	47	27	200	1475	13.56	86.	3.	5.	3.	2.	24.	39.	23.	14.
I	2050.00	0	0	0	0	0	0	0	.00	0.	0.	0.	0.	0.	0.	0.	0.	0.
K	2110.00	167	3	6	5	2	16	183	8.74	91.	2.	3.	3.	1.	19.	38.	31.	13.
M	2170.00	919	38	78	55	19	190	1109	17.13	83.	3.	7.	5.	2.	20.	41.	29.	10.
O	2230.00	992	48	61	63	18	190	1182	16.07	84.	4.	5.	5.	2.	25.	32.	33.	9.
Q	2290.00	734	64	86	131	52	333	1067	31.21	69.	6.	8.	12.	5.	19.	26.	39.	16.
S	2350.00	253	19	38	47	12	116	369	31.44	69.	5.	10.	13.	3.	16.	33.	41.	10.
U	2380.00	23	0	7	2	0	9	32	28.13	72.	0.	22.	6.	0.	0.	78.	22.	0.
W	2425.00	422	54	34	93	25	206	628	32.80	67.	9.	5.	15.	4.	26.	17.	45.	12.
Y	2455.00	286	88	183	82	120	473	759	62.32	38.	12.	24.	11.	16.	19.	39.	17.	25.
A	2485.00	5584	41	80	118	37	276	5860	4.71	95.	1.	1.	2.	1.	15.	29.	43.	13.
C	2515.00	3716	906	1039	279	429	2653	6369	41.65	58.	14.	16.	4.	7.	34.	39.	11.	16.
E	2545.00	1883	621	696	157	217	1691	3574	47.31	53.	17.	19.	4.	6.	37.	41.	9.	13.
G	2575.00	466	209	329	83	130	751	1217	61.71	38.	17.	27.	7.	11.	28.	44.	11.	17.

TABLE 2

ESSO AUSTRALIA LTD.

TOTAL ORGANIC CARBON REPORT

BASIN - GIPPSLAND
WELL - DRUMMER 1

SAMPLE NO.	DEPTH	AGE	FORMATION	AN	TOC%	AN	TOC%	AN	CO3%	DESCRIPTION
77864 D	2427.56	OLIGOCENE/MIOCENE	LAKES ENTRANCE FM	1	0.17		0.00	1	57.88	M GY-BRN SLTST,V CALC
77864 C	2429.00	OLIGOCENE/MIOCENE	LAKES ENTRANCE FM	1	0.19		0.00	1	41.52	M-DK GY SLTST,V CALC
77864 B	2431.55	OLIGOCENE/MIOCENE	LAKES ENTRANCE FM	1	0.20		0.00	1	36.35	LT-M GY SLTST,CALC,MDY
77864 A	2433.03	OLIGOCENE?	"FORTESCUE SHALE"	1	0.15		0.00	1	32.22	DK GY SDY SLTST,V CALC
77863 Z	2435.06	LATE-MID. EOCENE	GURNARD FM EQUIVALENT	1	0.75		0.00	1	40.53	DK GY-BRN SDY CLYST,CALC
77863 X	2438.51	LATE-MID. EOCENE	GURNARD FM EQUIVALENT	1	0.08		0.00	1	62.90	M-DK BRN SDY SLTST,CALC
77863 W	2439.56	LATE-MID. EOCENE	GURNARD FM EQUIVALENT	1	0.19		0.00	1	43.12	LT GY-BRN SLTY SST,CALC
77863 V	2441.44	LATE-MID. EOCENE	GURNARD FM EQUIVALENT	1	0.46		0.00	1	24.49	BRN SDY SLTST
77863 U	2443.50	LATE-MID. EOCENE	GURNARD FM EQUIVALENT	1	0.90		0.00	1	30.68	DK GY-BRN SDY SLTST,QTZ
77863 S	2446.73	LATE-MID. EOCENE	GURNARD FM EQUIVALENT	1	0.80		0.00	1	32.81	DK OL GY-BRN SDY SLTST
77863 R	2448.23	EARLY-MID. EOCENE	"OPAH CHANNEL FILL"	1	2.35		0.00	1	6.39	OL GY SLTST,PYRITE
77863 Q	2450.24	EARLY-MID. EOCENE	"OPAH CHANNEL FILL"	1	5.48		0.00	1	7.08	OL GY SLTST,PYRITE
77863 P	2478.79	EARLY EOCENE	LATROBE GROUP	1	8.13		0.00	1	1.58	M GY SLTST
77863 N	2485.53	EARLY EOCENE	LATROBE GROUP	1	0.21		0.00	1	4.28	M-LT GY SST
77863 K	2496.04	EARLY EOCENE	LATROBE GROUP	1	2.78		0.00	1	4.44	DK GY-BLK SLTST
77863 J	2498.98	EARLY EOCENE	LATROBE GROUP	1	3.63		0.00	1	5.40	DK GY SLTST,SL CARB
77863 I	2500.15	EARLY EOCENE	LATROBE GROUP	1	0.41		0.00	1	5.97	LT GY SLTST,M GY LAM
77863 H	2502.52	EARLY EOCENE	LATROBE GROUP	1	1.08		0.00	1	5.61	LT GY SLTST,M GY LAM
77863 G	2504.49	EARLY EOCENE	LATROBE GROUP	1	2.20		0.00	1	3.16	M-DK GY SLTST,SL CARB
77863 F	2509.02	EARLY EOCENE	LATROBE GROUP	1	1.58		0.00	1	4.65	M GY SLTST,LT GY LAM
77863 E	2511.50	EARLY EOCENE	LATROBE GROUP	1	1.92		0.00	1	6.16	M GY SLTST,LT GY SST LAM
77863 D	2531.55	EARLY EOCENE	LATROBE GROUP	1	3.01		0.00	1	2.22	DK GY SLTST
77863 C	2534.25	EARLY EOCENE	LATROBE GROUP	1	3.57		0.00	1	3.15	DK GY SLTST,LT GY LAM
77863 B	2538.99	EARLY EOCENE	LATROBE GROUP	1	1.25		0.00	1	4.98	DK GY SLTST
77863 A	2540.96	EARLY EOCENE	LATROBE GROUP	1	0.96		0.00	1	9.68	M GY SLTST,LAM

ROCK EVAL ANALYSES

BASIN - GIPPSLAND
WELL - DRUMMER 1

REPORT A - SULPHUR & PYROLYZABLE CARBON

SAMPLE NO.	DEPTH	SAMPLE TYPE	AGE	TMAX	S1	S2	S3	PI	S2/S3	PC	COMMENTS
77863 Z	2435.1	SWC	LATE-MID EOCENE	270.	.01	.01	.05	.67	.11	.00	
77863 U	2443.5	SWC	LATE-MID EOCENE	272.	.01	.01	.08	.33	.18	.00	
77863 S	2446.7	SWC	LATE-MID EOCENE	272.	.01	.01	.06	.50	.22	.00	
77863 R	2448.2	SWC	MID-EARLY EOCENE	272.	.00	.01	.06	.00	.17	.00	
77863 Q	2450.2	SWC	MID-EARLY EOCENE	431.	.01	.00	.04	1.00	.00	.00	
77863 P	2478.8	SWC	MID-EARLY EOCENE	428.	.60	10.42	.93	.05	11.27	.91	
77863 K	2496.0	SWC	EARLY EOCENE	422.	.31	1.82	.45	.14	4.04	.18	
77863 J	2499.0	SWC	EARLY EOCENE	414.	.09	.54	.23	.15	2.38	.05	
77863 H	2502.5	SWC	EARLY EOCENE	426.	.07	.32	.08	.17	3.78	.03	
77863 G	2504.5	SWC	EARLY EOCENE	422.	.30	2.64	.09	.10	30.33	.24	
77863 F	2509.0	SWC	EARLY EOCENE	426.	.14	.74	.08	.13	12.38	.09	
77863 E	2511.5	SWC	EARLY EOCENE	417.	.26	1.46	.14	.15	10.40	.14	
77863 D	2531.6	SWC	EARLY EOCENE	422.	.28	4.60	.21	.06	22.38	.40	
77863 C	2534.3	SWC	EARLY EOCENE	419.	.35	4.16	.19	.08	21.50	.37	
77863 B	2539.0	SWC	EARLY EOCENE	424.	.06	.18	.22	.24	.83	.02	
77863 A	2541.0	SWC	EARLY EOCENE	424.	.09	.29	.22	.24	1.33	.03	

PI=PRODUCTIVITY INDEX PC=PYROLYZABLE CARBON TC=TOTAL CARBON HI=HYDROGEN INDEX OI=OXYGEN INDEX

05/06/86 TABLE 3B

ESSO AUSTRALIA LTD.

PAGE

ROCK EVAL ANALYSES

BASIN - GIPPSLAND
WELL - DRUMMER 1

REPORT B - TOTAL CARBON, H/O INDICES

SAMPLE NO.	DEPTH	SAMPLE TYPE	FORMATION	TC	HI	OI	HI/OI	COMMENTS
77863 Z	2435.1	SWC	GURNARD FM EQUIVALENT	.75	1.	7.	.11	
77863 U	2443.5	SWC	GURNARD FM EQUIVALENT	.90	2.	8.	.18	
77863 S	2446.7	SWC	GURNARD FM EQUIVALENT	.80	2.	8.	.22	
77863 R	2448.2	SWC	'OPAH CHANNEL FILL'	2.35	0.	2.	.17	
77863 Q	2450.2	SWC	'OPAH CHANNEL FILL'	5.48	0.	1.	.00	
77863 P	2478.8	SWC	LATROBE GROUP	8.13	128.	11.	11.27	
77863 K	2496.0	SWC	LATROBE GROUP	2.78	65.	16.	4.04	
77863 J	2499.0	SWC	LATROBE GROUP	3.63	15.	6.	2.38	
77863 H	2502.5	SWC	LATROBE GROUP	1.08	30.	8.	3.78	
77863 G	2504.5	SWC	LATROBE GROUP	2.20	120.	4.	30.33	
77863 F	2509.0	SWC	LATROBE GROUP	1.58	60.	5.	12.38	
77863 E	2511.5	SWC	LATROBE GROUP	1.92	76.	7.	10.40	
77863 D	2531.6	SWC	LATROBE GROUP	3.01	153.	7.	22.38	
77863 C	2534.3	SWC	LATROBE GROUP	3.57	117.	5.	21.50	
77863 B	2539.0	SWC	LATROBE GROUP	1.25	14.	17.	.83	
77863 A	2541.0	SWC	LATROBE GROUP	.96	30.	23.	1.33	

PI=PRODUCTIVITY INDEX PC=PYROLYZABLE CARBON TC=TOTAL CARBON HI=HYDROGEN INDEX OI=OXYGEN INDEX

KEROGEN ELEMENTAL ANALYSIS REPORT

BASIN - GIPPSLAND
WELL - DRUMMER 1

SAMPLE NO.	DEPTH	SAMPLE TYPE	N%	C%	H%	S%	O%	ASH%	COMMENTS
			ELEMENTAL % (ASH FREE)						
77819 Q	2122.10	SWC	1.50	64.55	5.69	.00	28.26	11.36	HIGH ASH
77863 V	2441.44	SWC	2.50	50.34	3.34	.00	43.83	3.81	
77863 R	2448.23	SWC	1.03	72.04	5.57	.00	21.36	4.55	
77863 P	2478.79	CRSW	.85	70.86	5.42	.00	22.86	6.14	
77863 K	2496.04	SWC	.66	47.31	4.57	.00	47.46	5.48	
77863 J	2498.98	SWC	.99	71.81	5.12	.00	22.07	13.34	HIGH ASH
77863 I	2500.15	SWC	.65	70.96	4.73	.00	23.65	8.22	SMALL SAMPLE
77863 H	2502.52	SWC	.79	72.03	4.91	.00	22.27	8.59	
77863 G	2504.49	SWC	.85	69.53	5.35	.00	24.27	5.98	
77863 F	2509.02	SWC	.96	71.88	5.26	.00	21.90	9.32	
77863 E	2511.50	SWC	.65	66.26	5.07	.00	28.02	10.99	HIGH ASH
77863 D	2531.55	SWC	.88	72.05	5.34	.00	21.73	4.86	
77863 C	2534.25	SWC	.92	66.95	4.89	.00	27.24	5.48	
77863 B	2538.99	SWC	1.27	71.21	4.96	.00	22.56	14.29	SMALL SAMPLE,HIGH ASH
77863 A	2540.96	SWC	1.05	74.12	5.15	.00	19.68	3.51	

TABLE 4B

ESSO AUSTRALIA LTD.

KEROGEN ELEMENTAL ANALYSIS REPORT

BASIN - GIPPSLAND
WELL - DRUMMER 1

SAMPLE NO.	DEPTH	SAMPLE TYPE	AGE	FORMATION	ATOMIC RATIOS H/C	ATOMIC RATIOS O/C	ATOMIC RATIOS N/C	COMMENTS
77863 V	2441.44	SWC	LATE-MID. EOCENE	GURNARD FM EQUIVALENT	0.80	0.65	0.04	
77863 R	2448.23	SWC	EARLY-MID. EOCENE	"OPAH CHANNEL FILL"	0.93	0.22	0.01	
77863 K	2496.04	SWC	EARLY EOCENE	LATROBE GROUP	1.16	0.75	0.01	
77863 J	2498.98	SWC	EARLY EOCENE	LATROBE GROUP	0.86	0.23	0.01	HIGH ASH
77863 I	2500.15	SWC	EARLY EOCENE	LATROBE GROUP	0.80	0.25	0.01	SMALL SAMPLE
77863 H	2502.52	SWC	EARLY EOCENE	LATROBE GROUP	0.82	0.23	0.01	
77863 G	2504.49	SWC	EARLY EOCENE	LATROBE GROUP	0.92	0.26	0.01	
77863 F	2509.02	SWC	EARLY EOCENE	LATROBE GROUP	0.88	0.23	0.01	
77863 E	2511.50	SWC	EARLY EOCENE	LATROBE GROUP	0.92	0.32	0.01	HIGH ASH
77863 D	2531.55	SWC	EARLY EOCENE	LATROBE GROUP	0.89	0.23	0.01	
77863 C	2534.25	SWC	EARLY EOCENE	LATROBE GROUP	0.88	0.31	0.01	
77863 B	2538.99	SWC	EARLY EOCENE	LATROBE GROUP	0.84	0.24	0.02	SMALL SAMPLE,HIGH ASH
77863 A	2540.96	SWC	EARLY EOCENE	LATROBE GROUP	0.83	0.20	0.01	

TABLE 5

ESSO AUSTRALIA LTD.

VITRINITE REFLECTANCE REPORT

BASIN - GIPPSLAND
WELL - DRUMMER 1

SAMPLE NO.	DEPTH	AGE	FORMATION	AN	MAX RV	FLUORESCENCE	COUNTS	MACERAL TYPE
77864 D	2427.56	OLIGOCENE/MIOCENE	LAKES ENTRANCE FM	5	0.59	ORANGE	5	I>V=E,5 G
77863 J	2498.98	EARLY EOCENE	LATROBE GROUP	5	0.56	YEL-OR	25	E>V>I,DOM COMMON
77863 C	2534.25	EARLY EOCENE	LATROBE GROUP	5	0.55	YEL-YEL/OR	30	V>E>I,DOM ABUNDANT

APPENDIX 6

APPENDIX 6

SYNTHETIC SEISMIC TRACE
PARAMETERS

WELL	:	Drummer-1
T.D.	:	2571 metres KB
KB	:	21 metres
WATER DEPTH	:	74 metres
POLARITY	:	A positive acoustic impedence is represented as a trough on the trace.
PULSE TYPE	:	Zero phase second derivative, Gaussian Function.
PEAK FREQUENCY	:	30 Hz
SAMPLE INTERVAL	:	3 metres
CHECKSHOT CORRECTED	:	Yes
COMMENTS	:	Sonic log 219-2568.5m KB
	:	Density log 2400-2565.5m KB
		All logs filtered and edited.

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PE603721

This is an enclosure indicator page.
The enclosure PE603721 is enclosed within the container PE905435 at this location in this document.

The enclosure PE603721 has the following characteristics:

ITEM_BARCODE =	PE603721
CONTAINER_BARCODE =	PE905435
NAME =	Drummer 1 Synthetic Seismic Trace
BASIN =	GIPPSLAND
PERMIT =	VIC/P1
TYPE =	WELL
SUBTYPE =	SYNTH_SEISMOGRAPH
DESCRIPTION =	Drummer 1 Synthetic Seismogram Trace (from appendix 6, Volume 2, WCR)
REMARKS =	
DATE_CREATED =	23/10/85
DATE_RECEIVED =	12/06/87
W_NO =	W918
WELL_NAME =	Drummer-1
CONTRACTOR =	Esso Australia Ltd
CLIENT_OP_CO =	Esso Australia Ltd

(Inserted by DNRE - Vic Govt Mines Dept)

ENCLOSURES

ENCLOSURES

PE905437

This is an enclosure indicator page.
The enclosure PE905437 is enclosed within the container PE905435 at this location in this document.

The enclosure PE905437 has the following characteristics:

ITEM_BARCODE =	PE905437
CONTAINER_BARCODE =	PE905435
NAME =	Drummer 1 strat. correlation xsection (encl. 1)
BASIN =	GIPPSLAND
PERMIT =	VIC/P1
TYPE =	WELL
SUBTYPE =	CROSS_SECTION
DESCRIPTION =	Drummer 1 Stratigraphic Correlation Cross Section (Rockling 1-Tailor 1). Enclosure 1, Volume 2 of WCR.
REMARKS =	
DATE_CREATED =	31/08/85
DATE_RECEIVED =	12/06/87
W_NO =	W918
WELL_NAME =	Drummer-1
CONTRACTOR =	Esso Australia Ltd
CLIENT_OP_CO =	Esso Australia Ltd

(Inserted by DNRE - Vic Govt Mines Dept)

PE905436

This is an enclosure indicator page.
The enclosure PE905436 is enclosed within the container PE905435 at this location in this document.

The enclosure PE905436 has the following characteristics:

ITEM_BARCODE = PE905436
CONTAINER_BARCODE = PE905435
NAME = Drummer 1 strat. correlation xsection post drill (enc 2)
BASIN = GIPPSLAND
PERMIT = VIC/P1
TYPE = WELL
SUBTYPE = CROSS_SECTION
DESCRIPTION = Drummer 1 Stratigraphic Correlation Cross Section (Rockling 1-Drummer 1-Tailor 1). Enclosure 2, Volume 2 of WCR.
REMARKS =
DATE_CREATED = 28/02/87
DATE_RECEIVED = 12/06/87
W_NO = W918
WELL_NAME = Drummer-1
CONTRACTOR = Esso Australia Ltd
CLIENT_OP_CO = Esso Australia Ltd

(Inserted by DNRE - Vic Govt Mines Dept)

PE905438

This is an enclosure indicator page.
The enclosure PE905438 is enclosed within the container PE905435 at this location in this document.

The enclosure PE905438 has the following characteristics:

ITEM_BARCODE =	PE905438
CONTAINER_BARCODE =	PE905435
NAME =	Drummer 1 Structure Map top La Trobe Gp. Encl. 3.
BASIN =	GIPPSLAND
PERMIT =	VIC/P1
TYPE =	SEISMIC
SUBTYPE =	HRZN_CONTR_MAP
DESCRIPTION =	Drummer 1 Structure Map - Top La Trobe Group. Enclosure 3, Volume 2 of WCR.
REMARKS =	
DATE_CREATED =	31/08/85
DATE_RECEIVED =	12/06/87
W_NO =	W918
WELL_NAME =	Drummer-1
CONTRACTOR =	Esso Australia Ltd
CLIENT_OP_CO =	Esso Australia Ltd

(Inserted by DNRE - Vic Govt Mines Dept)

PE601138

This is an enclosure indicator page.
The enclosure PE601138 is enclosed within the container PE905435 at this location in this document.

The enclosure PE601138 has the following characteristics:

ITEM_BARCODE = PE601138
CONTAINER_BARCODE = PE905435
NAME = Well Completion log
BASIN = GIPPSLAND
PERMIT =
TYPE = WELL
SUBTYPE = COMPOSITE_LOG
DESCRIPTION = Well Completion log
REMARKS =
DATE_CREATED = 21/10/1985
DATE_RECEIVED = 12/06/1987
W_NO = W918
WELL_NAME = Drummer-1
CONTRACTOR = ESSO
CLIENT_OP_CO = ESSO

(Inserted by DNRE - Vic Govt Mines Dept)